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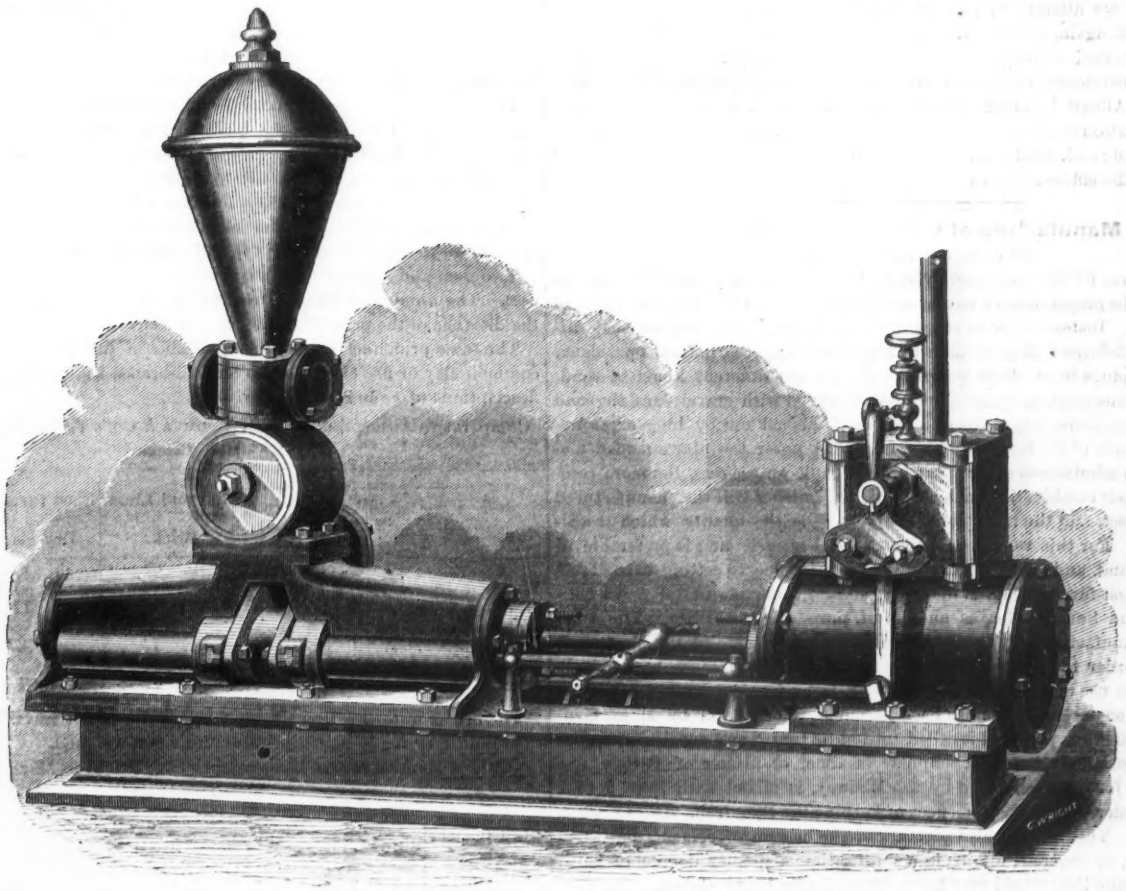
Direct Acting Plunger-Pump.

MR. CHARLES B. HARDICK, inventor and proprietor of the well-known Niagara Steam Pumps, has produced a plunger-pump, which, with exception of the water-cylinder and its arrangements, repeats the well approved design of the other Niagara pumps. Our illustration shows the construction of this new pump. We have in former times illustrated and described MR. HARDICK'S machines so frequently, that we have nothing now to add to those descriptions. This plunger-pump has been designed to meet the wants of steamboats, or other establishments that are forced to use gritty water. We have seen an upright double plunger-pump used to carry off the sand made in large ore-dressing works, forcing it to a height of 50-60 feet, and obtaining, in addition to cheapness of transportation, the advantage of packing the sand down in the waste heap,



HARDICK'S DIRECT ACTING PLUNGER PUMP.

and thereby getting one-third more on the same surface. The pump before us is fully capable of similar work. Its use of a plunger makes the task of repacking as easy as possible, and also avoids the friction incidental to the use of a piston.

New Steel Works, near Glasgow.

Fully two years ago it was currently reported in Glasgow that a very wealthy company was being privately organized in that city for the purpose of entering upon the manufacture of steel on a gigantic scale, a number of the prominent movers in the undertaking being directors or large shareholders in the Tharsis Sulphur and Copper Company. It was further stated that the company had arranged with Mr. SIEMENS to employ his heat-regenerative system in working their steel furnaces, as also any or all of his methods of producing steel, the whole being under he management-in-chief of an eminent engineer, Mr. MICHAEL SCOTT. After the lapse of some months the negociations entered into on behalf of the company resulted in the selection of a suitible site for the location of the works, and in the most unostentatious manner the ground was at length broken, and the necessary contracts were concluded for the excavations, branch railways, buildings, furnaces and other plant, machinery, &c. The site chosen was the estate of Hallside, between Newton and Camberslang, four or five miles to the east of Glasgow. It is most convenient both for water supply and for railway accommodation, there being an excellent and extensive gathering ground for water on the Cathkin Hills, which lie a short distance to the south of the works, while the South Side Branch of the Caledonian Railway passes immediately in front of the sloping ground on which the vast establishment is being reared.

Everything is laid out in a most systematic manner, so that there may be as much economy of labor as possible, and the works which are already erected constitute only one-third of what is ultimately intended. Sufficient progress has been made, however, to justify the company in commencing to make steel, which they did last week, and it is fully expected that they will turn out not less than 3,000 tons of rails by the end of the year. There is no scarcity of orders for rails; indeed, there is a great press, and hence the company have hurried on their arrangements for beginning to manufacture, even though the works are far from being finished. In the meantime rails only will be made, but ultimately it is intended to make steel tyres, axles, castings, forgings, &c.

Mercury in the System.

In Vienna, recently, Prof. HYATT delivered a lecture on mercury, when he exhibited the leg bone of a man whose death had undoubtedly b en hastened by

mercury. On striking the bone heavily upon the table, out fell thousands of little glittering globules of mercury—bright metallic mercury—which rolled about upon the black surface before him, collecting here and there into drops. This mercury had been absorbed during life, undermined the man's system, and proved fatal to him. The mortality among those who work in mines of quicksilver, or in the works where it is reduced, is known to be frightful. In the celebrated mines of Idria the men work alternately one month in the mines and one in the smelting house. But notwithstanding this, it appears that of the hundreds employed there, one-fourth become salivated. In the Royal College of Surgeons there is another leg-bone which is riddled by mercury.

VON PERGER, another Austrian, has been investigating the same subject in connection with the celebrated smelting works at Idria, and he has published his conclusions in the *Kärnthner Zeitschrift*. The inhabitants in the vicinity of the works have for almost a century made repeated complaints of the injurious influence of the mercurial vapors, but the authorities have persistently ignored them. These vapors are said not only to be noxious to man, but to cause a great mortality among the domestic animals. PERGER calculates that in the old Leopoldi furnace, having condensation chambers of masonry, with a loss of 25 to 33 per cent. of mercury, there was a yearly loss of 1,250 cwt. of mercury. Supposing 5 per cent. of this was lost in the form of vapor, there would be communicated to the air yearly 62.5 cwt., or 319,709 litres of mercurial vapor, besides 241,461 litres of sulphurous acid, or, daily, 958 litres of mercurial vapor and 660 litres of sulphurous acid. On breaking open a condensation chamber of a Leopoldi furnace, the bricks were found to be thoroughly impregnated with mercury. In the Alberti furnace, at present most used, having iron pipes for condensation, the loss is as great as in the preceding, while the newer muffle furnaces give much better results. When the finely pulverized ore is mixed with lime, formed into bricks, and heated in an iron muffle, there can be no loss of metal by transmission through the walls, and the sulphurous acid remains combined with the lime. But on opening a muffle after burning, the workmen are exposed to the vapors, and if we attempt to prevent this by drawing air through the muffle, mercury is lost again, which latter loss might, however, be avoided by more complete condensation, longer canals, and high chimneys. Among the most important improvements suggested to remedy the existing state of affairs are: replacing the Alberti by muffle furnaces with the most complete condensers possible; conduction of the vapors to one main high chimney; providing respirators for the workmen; and, finally, the appointment of a commission of experts to inspect and test the efficiency of these precautions.

The Manufacture of Compressed-Stone Bricks.*

BY J. J. BODMER OF LONDON.

THE substances or materials employed in this manufacture, are the same as those used in the preparation of mortar and concrete; viz: the different kinds of lime and sand. Instead of, or in conjunction with, sand there may be used calcined clay, blast-furnace slag, clinkers or ashes from furnaces, natural puzzolana, powdered chippings from stone quarries, etc. Of the different kinds of sand, pit-sand—silicious sand, as it commonly occurs mixed with gravel—and the sand found on the sea-shore, where the salt has been washed out by long exposure, whilst out of reach of the tide, may be used. The purer the above-named materials are from admixtures of clay, earth, or organic substances, the more complete will be their combination with the lime, the quicker will the manufactured brick or block set, and the more satisfactory will be the quality which it ultimately attains. For this reason, sub-divided blast-furnace slag is preferable in most cases to sand, and the only sand which in reference to setting capacity is analagous to blast-furnace slag, is the volcanic sand occurring in different localities in North and South Wales, as an almost pure calcined silica. The lime used for the manufacture may be either slaked or unslaked. In the first case, (slaked), in order to obtain satisfactory results, the lime must be strongly hydraulic. The use of unslaked lime, however, is by far preferable. A process for using fresh or unslaked lime has been patented in England by Major General Scott. Lime thus prepared is called "selenitic lime," and consists of a mixture of fresh (unslaked) lime with sulphate of lime, or plaster of Paris. The grey stone lime for instance, found by the Medway, is mixed with from 5 to 7 per cent. of plaster, which has the effect of keeping the lime from slaking when water is added. This mixture also partakes of the nature of cement, and when used for mortar, or concrete, attains in a shorter time a greater degree of hardness than the same lime would ever have obtained after being slaked.

BODMER'S process for the manufacture of artificial stone bricks consists chiefly in the use of automatic measuring, forwarding and mixing apparatus, by means of which the materials are supplied and unite in a continuous stream, and are accurately measured. They are then mixed and amalgamated automatically in a very perfect manner. Both the lime and the plaster are used in the form of powder. Supposing that two kinds of lime are used, besides plaster, each of these substances is fed into a separate hopper, from which they drop into a measuring apparatus. The outflow and speed of this apparatus is so arranged that, for instance, 80 per cent. of one kind of lime may be fed out during the time in which 20 per cent. of the other kind and 5 per cent. of plaster are delivered.

The stream formed by the three materials, then flows into a *dry mixing* apparatus, in which a most perfect amalgamation of the particles takes place. Issuing from this, it is made to pass through a pair of rolls, going at differential speed, which grind up and rub the particles into each other. The sand, or sub-divided slag, is fed into a similar measuring apparatus, from which it issues in a uniform layer on an endless india-rubber belt.

The proportions of sand, or slag, and lime depend chiefly upon the quality of the latter, and may consist of 5-8 lb. or more of sand or slag to 1 lb. of the lime mixture. The lime mixture drops from the rolls upon the travelling layer of sand, or slag, (which has been moistened as required, by a watering apparatus), and the several ingredients are made to travel into a mixing drum, and from that to a final amalgamating apparatus. From this last named apparatus the now finished mixture is carried by a belt to the press.

There are three methods of mixture:—

1. *Dry Mixture.*—In this process just as much water is added as is required for complete mixture of the sand and lime, so that on pressure being applied, no moisture is given off. But each grain of sand, or slag, must have its coating or skin of lime.

2. *Half-wet Mixture.*—In this process an excess of water is added; the mass is allowed to lie till this excess is absorbed; and before the mixture begins to set, it is fed into the press. The coating of each particle of sand, or slag, with lime, is in this case more certain and complete, and this process, under certain conditions, possesses many advantages over the foregoing. The dry mixture, however, is more convenient to work, and is giving most satisfactory results.

3. *Wet Mixture.*—In this process still more water is added, and the mixture is simply filled into moulds, or used for mortar and allowed to set without pressure. If instead of, or in conjunction with, lime cement is used in order to quicken the hardening process, this method (wet mixing) is preferable for forming large blocks, etc.

Pressing.—For the forming or pressing of the bricks a hydraulic press is used, which is supplied by a pump and accumulator. The press has a horizontal turn-table, in which there are six pairs of moulds. While two pairs are being filled, by means of a hopper, two others are under pressure; and the last two pairs deliver finished bricks on the surface of the table, from which they are taken off, put on barrows and carried out to the shed, or into the yard, where they are piled up and left until required for use.

From 6 to 8 weeks are required for the hardening of sand and lime bricks. The time depends chiefly on the quality of the sand and lime, and partly on the weather. The hardening process goes on for years, and the difference in hardness may be observed from month to month.

The before-mentioned press is calculated for seven strokes per minute, that is to say, for a production of 28 bricks per minute. A pressure of 10 cwt. per sq. inch, or 20 tons per brick of $9 \times 4\frac{1}{2} \times 2\frac{3}{4}$ inches is found sufficient.

Two men and four boys are required for the whole of the manufacturing process. The number of hands for wheeling and piling the bricks depends upon the distance of the press from the shed or field where the bricks are deposited.

The same principle of press is applicable in the manufacture of bricks from common clay or fire clay; as also for fuel-bricks, asphalt-bricks, and many other descriptions of compressed materials.

Comparative Absorption Tests of BODMER & Co.'s Patent Stone Bricks and of Clay Bricks.

	Best Gault Clay Brick.	Best Stock Clay Brick.	Sand and Lime Brick.	Blast furnace Dry Slag.	Slag and Lime. Spongy Slag.
	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.
Weighed dry.....	5 15	4 13	6 9¾	7 7½	5 7¾
Weighed wet.....	7 2¼	5 14½	7 1¼	7 12¼	5 14½
Water taken up per Brick.....	1 3¼	1 1½	0 7½	0 4¾	0 6¾
Percentage of water taken up	20.26	22.72	7.09	3.97	7.69

The bricks were dried on a heated iron plate and then weighed. They were then immersed for 50 hours in water and again weighed.

Cost of Manufacture of Blast-furnace Slag Bricks in Materials and Wages. BODMER'S Patent.

Blast-furnace Slag.		Sifted Lime.		Wages.		Total cost of 1,000 Bricks.	Cost of Sub-dividing Slag.	
Per ton.	Per 1,000 Bricks.	Per ton.	Per 1,000 Bricks.	Per week.	Per 1,000 Bricks.		One 4 h. p. Engine at 5 lb. per hour per h. p. Coal at 20s. per ton.....	Per week.
s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	WAGES: 1 man by day,	£1 10 0
0 6	1 3½	27 0	10 9½	169 2	2 1½	14 2½	" 1 " night, at 24s.....	2 8 0
0 6	1 3½	25 0	10 0	"	2 1½	13 5		3 18 0
0 6	1 3½	22 0	8 9½	"	2 1½	12 2½	240 tons of slag at 6d. per ton.....	6 0 0
0 6	1 3½	20 0	8 0	"	2 1½	11 5	Profit per week on Slag used.....	2 2 0
0 6	1 3½	18 0	7 2	"	2 1½	10 7	80,000 Bricks pr week.	per press.
0 6	1 3½	16 0	6 4½	"	2 1½	9 9¾		
0 6	1 3½	14 0	5 7	"	2 1½	9 0		

The slag is supposed to be delivered in a sub-divided condition at the brick works.

Weight of bricks about 3 tons per 1,000.

Mixture about 52 cwt. of slag with 8 cwt. of lime.

Wages calculated upon 2 men at 5d. per hour, 58 hours per week.
10 boys at 2½d. " " " " "

* A paper read before the American Institute of Mining Engineers, at Easton, Pa., Oct. 22, 1873.

The American Iron and Steel Association.

THE Annual Meeting of this Association took place on Thursday, November 20, 1872, at Philadelphia, SAMUEL J. REEVES, Esq., the President, in the chair. There was a large attendance of the members. Following is an abstract of the statistical report of the Secretary:

The year 1872 opened with an increased demand for iron in nearly all civilized countries. Prices advanced rapidly in all markets. The supply was unequal to the demand, although production was everywhere stimulated. In the United States forty new blast furnaces were erected, and the erection of others was undertaken—the foreign demand for British iron and the increased cost of producing that iron leading to the reasonable presumption that our people would now be able to possess their own iron markets.

The high prices for iron of all descriptions which had prevailed in the United States in 1872 gradually declined during the latter part of that year, and this decline, with some effort at a rally in January, continued during 1873. It was not sufficient, however, to restrict production, jeopardize the interests of producers, or compel a reduction of wages. The causes of the decline may be found, first, in the natural tendency of high prices to restrict consumption, and thus bring about sharper competition; and, second, in the forced subsidence at the close of 1872 of the fever for building Western railroads. Owing to these causes, the demand for rails and other railway material fell off greatly at the close of 1872, while in some other branches of business, usually requiring large supplies of iron, consumption was considerably curtailed at the same period This condition of business—restricted consumption and gradually declining prices, with foreign competition still existing, and a tendency in some iron districts to accumulate stocks of pig iron—prevailed on the 18th of September, when the present financial crisis commenced by the suspension of a leading banking house largely interested in railroad securities. This crisis has deranged the whole business of the country. The prices of iron have still further declined, reaching in some lines of the trade to a point far below the cost of production. The blow has been severely felt. At the beginning of November the quoted prices of raw and manufactured iron were almost as low as at the beginning of 1871, before the rise commenced; the price of rails was fully as low; while the demand for iron for railroad construction, cars, car wheels, locomotives, iron railroad bridges, and every branch of manufactures dependent upon railroad patronage, had almost ceased. At the date mentioned, the prices asked for four leading articles of American iron manufacture were as follows: BESSEMER rails at mill, $110; iron rails, at mill, $68; best No. 1 anthracite pig iron, at Philadelphia, $36; merchant bars, at Pittsburgh, 3 cents. From cash buyers even lower rates than these would readily have been accepted. English iron rails were sold at New York at $60, gold. On the 17th of September, the day before the occurrence of the crisis, the above-mentioned articles were quoted as follows: American BESSEMER rails, $120; iron rails, $75; No. 1 pig iron, at Philadelphia, $42; merchant bars, at Pittsburg, 3½ cents; English iron rails at New York, $65, gold. The average decline since September has been fully 15 per cent., with few sales transpiring, and they mostly in small lots for immediate use.

At the beginning of November many blast furnaces, bar mills, and rail mills were idle. After a careful survey of the whole field, we are satisfied that fully *one-third* of our furnaces were then out of blast, and that by the close of the month *one-half* of all the furnaces will be blown out. Stocks of pig iron are accumulating in many districts, for which there is no sale at any price. Most of the bar and rail mills that are now running are working on short time. Rail mills especially are bare of orders, with no immediate prospect of a change for the better. The plate mills are more favored. Thousands of iron-workers, at the beginning of winter, are out of employment, while a large proportion of those who are yet employed have accepted a reduction of wages averaging 15 per cent. The mining of iron ore has sympathized with the prostration of the iron trade.

The financier or the philosopher who would undertake to predict when the above described state of the iron trade and its adjuncts will assume a more favorable aspect, would be a bold man, and would likely win for himself the reputation of being a false prophet. The crisis, however, and the conditions which preceded it, have produced one result which will reach into the immediate future, and which all men may easily comprehend: the home production of all kinds of iron will be equal to the home demand, under any circumstances, for some time to come.

PRODUCTION OF PIG IRON IN THE UNITED STATES.

The production of pig iron in the United States in the year 1872 was 2,830,070 net tons, or 2,526,848 gross tons. This quantity was produced in twenty-one States. The ascertained production during the first six months of 1873 was 1,393,075 net tons, and the estimated production for the whole of the year 1873 is 2,695,434 net tons, or 2,406,637 gross tons. The number of States which made pig iron this year was twenty-two—Maine having re-entered the list after a long rest. The excess of production in 1872 over the estimated production of 1873 is 134,636 net tons. If the financial crisis had not occurred, the production of 1873 would have exceeded 3,000,000 net tons. The estimated annual capacity of all the furnaces in the United States is 4,371,277 net tons.

The total number of furnaces in the United States, exclusive of abandoned and projected furnaces, is 636. The total number of new furnaces finished and put in blast in 1872 was forty-one; finished and put in blast in 1873, forty-two; total number of new furnaces put in blast in the last two years, eighty-three. Many of these are among the largest in the country. By the erection of these eighty-three furnaces, the furnace capacity of the country has been increased fully one-fourth. The new furnace of the Lackawanna Iron and Coal Company, at Scranton, Pa., finished in 1873, is sixty-seven feet high, and the bosh is twenty-three feet in diameter. The new furnace of the Franklin Iron Company, in Sussex county, N. J., completed in 1873, is also sixty-seven feet high, and twenty-three feet in diameter at the bosh. Of the new furnaces at Pittsburgh, four stacks, completed in 1872, deserve special mention because of their large size and great capacity. The Lucy furnace of KLOMAN & CARNEGIE BROTHERS is seventy-five feet high by twenty feet diameter of bosh. Its capacity is five hundred and seventy-five tons a week. The two Isabella furnaces are both seventy-five feet high, while the diameter of the bosh of one is eighteen feet and of the other twenty feet. Their united capacity is nine hundred tons a week. They are owned by the Isabella Furnace Company. The Soho furnace, MOORHEAD, MCCLEANE & Co., proprietors, near Pittsburgh, is sixty-five feet high by eighteen feet bosh. Its capacity is about five hundred tons a week.

Pennsylvania still maintains her position at the head of the States which make pig iron. In 1872, and again in 1873, her furnaces produced very nearly *one-half* of the total yield of the whole country. The three Western States of Michigan, Wisconsin and Missouri, with sixty-four furnaces, have this year made *one-tenth* of the total yield.

There is one furnace in Texas which is making pig iron this year. It is situated near Jefferson, in Marion County. A letter to this office from Mr. H. C. HYNSON, of Jefferson, states that extensive and valuable iron mines exist near that place, which can be bought at five dollars an acre. Coal can be obtained at fair prices, and excellent railroad facilities exist. The Texas and Pacific railroad will undoubtedly open up rich deposits of both iron ore and coal in Texas. Over two hundred miles of this road are now finished and in operations.

It is somewhat remarkable that there is no furnace in Delaware. Forty years ago there were many charcoal furnaces and other iron works in Sussex County, in this State, which produced iron of the best quality. There is yet an abundance of excellent ore in that county, and both anthracite and bituminous coal can easily be obtained for smelting it.

PRODUCTIONS OF RAILS IN THE UNITED STATES.

The total number of net tons of iron and steel rails made in the United States in 1872, as reported to this office by the makers, is 941,992, or 841,064 gross tons. This aggregate was produced in sixteen States. Pennsylvania made 419,529 tons, 44½ per cent. of the whole. Ohio comes second in the list, taking the place which Illinois held in 1871. Illinois is the third State in the list, and New York the fourth. In the production of steel rails, the relative position of these four great iron producing States is almost the same—Pennsylvania producing 38,463 tons; Ohio, 22,000 tons; Illinois, 15,930 tons; and New York, 17,677 tons; total, 94, 070 net tons. No other States made Bessemer rails in 1872.

This aggregate of production includes only such rails as are made for the use of freight and passenger railways, and excludes an ascertained production of 15,000 tons of street rails, and all mining rails made during the year. Adding these to the above aggregate, the total production of rails of all sorts in the United States in 1872 was undoubtedly *one million net tons.*

The production of rails in the United States in 1871 was 775,733 net tons; in 1872 it was 941,992 tons. Increase, 166,259 tons, or 21½ per cent. The importation of foreign rails in 1871 was 566,202 net tons; in 1872 it was 530,850 tons. Decrease, 35,352 tons, or 6¼ per cent. The net gain of the American rail-maker in 1872 over his foreign rival was therefore 201,611 net tons.

Of the total production of 941,992 net tons of rails in 1872, 94,070 tons were Bessemer steel rails. In 1871 there were produced 60,042 net tons of steel and steel-headed rails. Increase, 34,028 tons, or 56⅔ per cent. Of the 530,850 net tons of rails imported in 1872, 147,786 tons were steel rails.

The total consumption of iron and steel rails in 1871 was 1,341,935 net tons; in 1872 it was 1,472,842 tons. Increase, 130,907 tons. The increased consumption was more than equaled by the increased production of American mills, which was 166,259 tons. as above stated.

During the year 1871, the export from the United States of American railroad bars and rails was 305 net tons; during 1872 the export was 1,296 tons. Increase, 323 per cent.

England will send this year about 150,000 tons of rails, but it is exceedingly probable that there will be just this quantity of rails on hand and unsold in the country on the thirty-first day of December next, with many American mills standing idle the whole or part of the year. The American make during the year will be about 850,000 net tons (less than last year,) of which about 120,000 tons will be Bessemer rails.

PRODUCTION OF ROLLED AND FORGED IRON.

An estimate of the production in 1872 and 1873 of the merchant bar mills, plate mills, and other rolling mills, exclusive of rail mills, can be made with some approach to accuracy. Observing the classification heretofore in use in this office, we submit the following figures for 1872 and 1873, in tons of 2,000 pounds:

	1872.	1873.
Merchant bar and rod	500,000	400,000
Sheet and plate	200,000	250,000
Hoop	30,000	30,000
Nails and spikes	175,000	200,000
Axles, etc	95,000	100,000
Total net tons	1,000,000	980,000
Add iron and steel rails	941,992	850,000
Total rolled iron, net tons	1,941,992	1,830,000

The estimated production in 1871 of rolled iron other than rails was given by this office at 710,000 net tons.

The product of the forges and bloomeries of the country, strictly so-called, is estimated at 58,000 net tons in 1872, and 50,000 tons in 1873.

PRODUCTION OF STEEL.

There were produced in the United States in 1872 about 32,000 net tons of cast steel, and in 1873 there will be produced about 28,000 tons. In 1871 there were converted 45,000 net tons of Bessemer steel; in 1872, 110,500 tons; and in 1873 it is estimated that there will be converted 140,000 tons. About 85 per cent. of the Bessemer steel that is now converted in American works passes into rails.

The total quantity of pig metal converted in this country by the pneumatic process, in the year 1872, was 125,361 gross tons. During the first nine months of 1873 the total quantity converted was 127,384 tons.

The production of steel in the United States by the Siemens-Martin process aggregated only a few thousand tons in 1872. The business was confined to seven establishments. As this quality of steel cannot be so cheaply produced as Bessemer steel, it is difficult to estimate the extent to which its production will be carried in future years, but we hear of one new enterprise in its manufacture having been inaugurated this year.

Bessemer works, for the conversion of steel and the rolling of rails, are now in operation at the following places, Troy, N. Y.; Johnstown, Pa.; Harrisburg, Pa.; Bethlehem, Pa.; Newburg, Ohio; Chicago, Illinois (two separate establishments); and Joliet, Illinois. The Pennsylvania Steel Works, at Harrisburg, are building a new plant, to be completed in 1874, which will double their present capacity. The Edgar Thomson Steel Works, near Pittsburgh, Pa., are in course of erection, and it is expected will be finished in 1874.

The total annual capacity of the eight Bessemer works now in operation is about 170,000 net tons of rails; to which add Edgar Thomson, and new plant of Pennsylvania Steel Works, and the total capacity of the Bessemer works of the United States at the close of 1874 may be placed at 222,000 net tons of rails.

SUMMARY OF IRON AND STEEL PRODUCTION.

Below is a summary in net tons, of the ascertained and estimated production of iron and steel in the United States in 1872 and 1873:

	1872.	1873.
Iron and steel rails	941,992	850,000
Other rolled and hammered iron	1,000,000	980,000
Forges and bloomeries	58,000	50,000
Cast steel	32,000	28,000
Bessemer steel	110,500	140,000
Siemens-Martin steel	3,000	3,500
Pig iron	2,830,070	2,695,434

RAILROAD CONSTRUCTION.

We estimate the mileage of new track for the year 1873 at only 3,000 miles, a decrease since last year of more than fifty per cent. The year 1871 witnessed the culmination of railroad construction in this country. The number of miles built in that year was 7,779. The reaction commenced in 1872, when 6,427 miles were built. The total railroad construction of 1874 is estimated at 3,000 miles, the same mileage as the estimate for 1873.

An event of interest in connection with our railroad progress was consummated on the fourth of October of this year. The change of the gauge of the Grand Trunk Railway of Canada, from the English gauge of 5¼ feet to the American gauge of 4 feet 8½ inches, was then completed. It is expected that by this change the Grand Trunk Railway will be enabled to interchange rolling stock with most American railroads.

The opening of the Chesapeake and Ohio Railroad, which connects the Atlantic Ocean and the Ohio River, passing through Virginia and West Virginia coal fields and iron ore deposits, is an event of the year which will greatly influence the future of the iron trade of the country.

SHIPMENTS OF IRON TO ENGLAND.

We have emphasized the statement that no pig iron was shipped during the last fiscal year to the British Islands, because various statements have appeared in the public prints setting forth that such shipments were made. The Marquette *Mining Journal*, however, in its issue for October 9th, states that from 1,200 to 1,500 tons of Lake Superior charcoal iron have been shipped this year to Glasgow and Liverpool. It adds: "There are now strong inquiries from abroad for Lake Superior pig iron. English iron merchants are now in correspondence with our furnacemen with a view of arranging for direct shipments next year."

There should be nothing surprising in the fact that No. 1 charcoal pig iron has been shipped from Lake Superior to Great Britain. Iron of this quality is essentially necessary in the manufacture of certain iron products, but, owing to the cutting down of some of their forests, and the absorption of others by the gentry, England and Scotland now manufacture but a small quantity. It is stated that there is but one charcoal furnace now in blast in Great Britain. Swedish charcoal pig iron is now exceptionally high in price. English and Scotch founders have of late made some advances towards the adoption of the American method of making car-wheels, which requires charcoal pig iron of the best quality. It may be possible that these founders will hereafter require a part of our product for this purpose. But this demand would be entirely exceptional, and could not be regarded as at all affecting the general proposition that this country can not compete with the United Kingdom in its own markets for its own iron supply. We think it more probable that the Lake Superior pig iron which has been taken to England has been purchased at a loss, with the view of inducing the makers of Swedish pig iron to lower their prices.

BRITISH IRON AND COAL STATISTICS.

Statistics of the production of British iron and steel for 1872 are very meagre. About 400,000 tons of Bessemer steel were converted during the year. There were in operation about 700 blast furnaces, and 7,000 puddling furnaces. Twenty-one blast furnaces are are now in course of erection in the North of England.

The total consumption of Scotch pig iron has steadily increased since 1871, while the production was only a few tons greater in 1872 than in 1871. The stock on hand, which was greatly reduced in 1872, has been still further reduced in 1873.

The total production of pig iron in Great Braitain, in gross tons, since 1867, was as follows: 1867, 4,761,023; 1868, 4 970,206; 1869, 5,445,757; 1870, 5,963,515; 1871, 6,627,179; 1882, 6,723,387. In 1862 the production was about 4,000,000 tons. Mr. I. LOWTHIAN BELL has estimated that, at the rate of increase which has existed since 1862, the production of pig iron in Great Britain ought to reach 11,500,000 tons in 1882, and that, to meet this production and the probable extension of British malleable iron works, something like 65,000,000 tons of coal would be required, or more than one-half the total production of coal in 1872.

The total production of bar iron and steel in Great Britain in 1869 was 4,734,145 gross tons; in 1871 it was 5,566,175 tons.

THE IRON ORES OF SPAIN AND ALGERIA.

Spain might manufacture iron largely if it would, but its people prefer to buy their iron abroad and send away their rich iron ore. Since the close of 1869 the manufacture of iron in Spain has been on the decline. Mr. J. JOONIS, the Belgian Minister *ad interim* to the Spanish Republic, reports to his government the causes of this decline. He says: "Three causes have been instrumental in bringing about this deplorable result: first, high coal; second, high wages; and, third, *duty free import for railroad purposes.*" The manufacture of steel has also declined. The shipments of iron ore to Great Britain alone amounted to several hundred thousand tons in 1872. In exact figures, the export of ore to Great Britain has increased from 88,000 tons in 1868 to 631,000 tons in 1872. In addition to British requirements, there is a constant and large demand for Spanish ore from Germany, France and Belgium. In the early part of 1873 the shipments increased, but since then the civil dissensions of the country have interfered with the working of the principal mines.

The iron ore mines of Algeria are being worked with much energy by French and English capitalists. The ore is generally of the richest quality, and much of it is adapted to the manufacture of Bessemer pig. The same is true of most of the Spanish ore. England imported 55,000 tons of Algerian ore from one mine during the first eleven months of 1872. The total quantity of ore exported from Algeria to all countries during the four years from 1867 to 1870 was 800,000 tons. France imported 155,698 tons in 1871. The production of ore in 1872 was 334,924 tons. There are no blast furnaces in Algeria, but it is proposed to begin their erection, and, in the absence of native fuel of all kinds, to use coal which may be taken by steamers as return cargoes. It has been found to be profitable to ship Algerian ore to the United States, a cargo having been received at New York last summer. It was purchased by COOPER, HEWITT & Co. and the Bethlehem Iron Company. A small cargo of Spanish ore from Bilboa was bought during the present year by the Pennsylvania Steel Company, which analyzed about fifty-three per cent., and proved to be every way of excellent quality.

IRON ORE STATISTICS.

Owing to the canceling of orders and other financial influences, the shipments of Lake Superior iron ore this season have increased very slightly over those of 1872. Up to the 5th day of November inst., at which date shipments for the season had almost closed, 1,099,033 gross tons of iron ore and pig iron had been shipped from the district, against a total shipment of 1872 of 1,015,250 tons.

Considerable quantities of Southern iron ores have been shipped to the North this year. The trade began in 1872. Mr. GEORGE H. HULL, of Louisville, Ky., has sold this year about 25,000 tons of Alabama brown hematite to furnaces in Indiana and on the Ohio river.

Decrease in Imports.

THE Chief of the Bureau of Statistics furnishes the following information, which shows how greatly the imports of this country from Great Britain have fallen off within the last year:

	Ten months, ended Oct. 31, 1872.	Ten months ended Oct. 31, 1873.		
Cotton Manufacturers—Piece goods	£3,248,514	£2,496,972		
Earthen and china ware	£659,005	£495,558		
Haberdashery	£1,257,016	£1,193,-87		
Hardware and cutlery	£788 523	£685,044		
Iron, pig, tons	175,816	96,395	45	per cent.
Iron, bar, bolt, and rod, tons	58,174	22,223	62	"
Iron, railroad, tons	410,010	160,036	60	"
Iron, hoop, sheet, and boiler, tons	27.592	17,480	36	"
Tin plates, tons	78 633	76,415	3	"
Steel, tons	19,516	16.594	15	"
Lead, tons	7,023	2,585	63	"
Linen piece goods	£3,221,770	£2 6"6,081		
Silks	£142,084	£72,100		
Ribbons	£58,446	£49.645		
Mixed goods	£182,133	£73,750		
Spirits, gallons	149,034	144,186		
Wool, pounds	1,773,251	730.461		
Woolens	£1 185,907	£1,084,178		
Worsted stuffs	£3,821.575	£3,677,369		
Carpets	£1,130,632	£760,205		

It will be observed that this decrease relates to *quantities*, and not to values. The latter in some cases show an increase even when there is a very considerable decrease of quantities. The above table shows that tinned goods alone have held their own. Other metals have fallen off from 15 to 63 per cent. The total decrease in all metals except "hardware and cutlery" is 385,086 tons, or close on 50 per cent.

THE COAL TRADE

NEW YORK, Nov. 28, 1873.

The auction sale on Wednesday resulted in a small decline on all sizes, except Steamer.

		Nov.	Dec.	Adv.	Dec.
9,000	Steamer	$4.83¾	$4.86	2¼c.	
14,000	Broken	5.00	4.99		1c.
9,000	Egg	5.31½	5.30		1½c.
30,000	Stove	5.45	5.44½		½c.
8,000	Chestnut	4.55	4.53		2c.
70,000					

Thus the auction sale again fails to be any indication of the market. Its manipulation is a thing proved by the entire lack of sympathy with the feeling of the trade. Formerly the opposite was true, and the great companies were called to the bar of the coal trade once a month, and often awaited their fate with alarm. Now the auction sale, instead of being an index of what buyers are willing to give for coal, is only an instrument in the hands of sellers, and is used by them to strengthen their control of the market. The present month has been remarkable for a real break in the prices of one company, which is among the most prominent in the trade. None of the other companies followed suit, and the auction sale of course reflected the views of those other companies. This difference of opinion is the more remarkable, as the reduction occurred in the circular of a concern, which is noted for the steadiness of its business and the regularity of its sales, at times when other dealers have to work hard to get rid of their coal. It is of course, a question whether the continuance of high prices is wise or not. That problem, however, cannot be solved without access to the most private accounts of the companies. Common report says that the schemes into which they entered last summer, were so successful as to fill up the large takers with all the coal they can use during the whole winter. In fact, it is said that prices can be sustained no longer without a marked reduction in the amount of coal marketed, and that the companies principally concerned have determined to put such a reduction in force at once. We cannot vouch for the story, but either this is true, or the market eastward and elsewhere is less fully stocked than all reports represent it to be. We quoted last week from the Mauch Chunk *Gazette* an assertion, to the effect that work in the mines had been reduced about one half; and below we print a letter to another contemporary, which gives a much brighter picture of affairs in a field near Mauch Chunk. Our readers may believe which ever they prefer.

A correspondent of the New York *Times*, writing from Scranton, Pa., Nov. 22d, gives a picture of the state of business in that region, which, though very hopeful throughout, seems to be written in a moderate and careful way. He says:

"Although, to some extent, there exists here a feeling of uneasiness and anxiety with regard to the future, the financial difficulties which have been felt with such force in other parts of the State have not had any very serious effect on the business community in this vicinity. It is true there has been considerable difficulty experienced in carrying out operations of a financial character, which has naturally reacted upon all other affairs; but for all that, business generally has maintained, through the trying times of the past six weeks, a healthier tone than was expected. Here, as at Wilkesbarre, the principal interest is centered in coal-mining, which gives employment and support to the greater part of the population of the city. The mines have been and are still kept open, although the product has been considerably reduced by a curtailment of the working hours. It was deemed better, in the interests of all operators, miners and laborers, to adopt this reduction of time, and consequently the amount to be paid for wages, than to suspend the workings altogether. The men, generally, have cheerfully accepted the situation, and deem themselves fortunate in having any work to do, while they hear of the thousands out of employment in other parts of the country. Among the operators the belief appears to be pretty general that the worst trouble has been seen, and that from now matters will begin to improve. They say that although their business has been greatly affected by the stoppage of so many iron furnaces and mills, yet the demand for anthracite coal in the larger cities must continue through the winter. By this means it is anticipated that the miners can be kept in employment through the winter months. It is also argued that the demand must be kept up, as the quantities now held in the large cities and towns are smaller than ever was known to be the case in previous years at this season. There also appears to be an opinion gaining ground that the ironmasters will resume operations very shortly, which will bring them also into the coal market as large buyers. There is generally a more hopeful feeling creeping over all in any way connected with business in this region, which greatly tends toward bringing about increased confidence. The banks, too, are said to be manifesting considerable more disposition than was the case even a week ago to assist their customers, and discounts are to-day obtained with more ease, although rates remain about the same. This action on their part has been brought about, it is said, by the increased feeling of security exhibited by the people, who are once more beginning to place their money in the banks. There is unquestionably a large amount of business done by all the banking houses in the shape of renewals, but even these are granted with more cheerfulness than they were a few days since.

"Business men are still complaining that collections are made with difficulty; they say, however, that their smaller customers are paying their accounts with more promptness than was anticipated. The fitting out and commissioning of the numerous iron-clads and other steamships belonging to the navy is looked upon as another favorable omen for the coal trade. The signs that the railway companies will very soon be giving orders for all kinds of supplies are, it is generally thought, daily increasing, and as soon as such orders come in, many of the iron works which are now idle will again be started in full life. Even now the iron trade along the Lehigh Valley, which probably suffered as badly as any from the panic, shows signs of improvement, for some two or three of the large works which were closed up entirely are now making preparations to set their fires going again, and their managers announce their intention of recommencing operations next week The class which appears to be suffering the most from existing circumstances are undoubtedly the retail store-keepers; their business has fallen off most materially, and, in fact, they are doing scarcely anything. They, in turn, are buying no goods, and in place of paying their accounts in cash, they are giving their notes at thirty and sixty days, with the understanding that, should they be unable to meet them at maturity, they are to be renewed. They do not look for any improvement before the turn of the year, being convinced that at the present time the people are economizing in every possible form.

"At the mines in this neighborhood the only dismissals that have taken place have been of men who were engaged in sinking new shafts and opening up prospective openings and seams. This work there is now no disposition to push until there is a better condition of affairs. A number of carpenters, mechanics, and laborers are thus thrown out of work, but the proportion to the total number of men employed is very small. The men at most of the collieries are paid in cash, although in one or two instances only one-half money is paid, credit being given to the men at the stores for the balance. Among the iron foundries, machine shops, and rolling mills wages have been generally reduced ten to twelve per cent., and the corps of men brought down to the lowest possible minimum. The masters are complaining of their inability to procure payment of their accounts, but appear to think that business will soon improve, as they are now receiving a few small orders."

Bituminous.

In the soft coal trade there is really nothing to report. The daily press is jubilant over the fact that the British authorities have decided to coal their West India squadron from our mines. Pittsburgh papers report that the difficulties with the miners in that region seem to approach their end. The condition of trade in this country certainly does not warrant any body of men in staying out on strike, if work is offered at any rate whatever.

Anthracite Coal Trade for 1872 and 1873.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending Nov. 22, 1873, compared with the week ending Nov 23, 1872.

COMPANIES.	1872. WEEK.	1872. TOTAL.	1873. WEEK.	1873. TOTAL.
Phila & Reading R.R†..	78,086	4,234,059	97,986	4,647,441
†Schuylkill Canal	12,982	812,838	21,247	721,774
Lehigh Valley R. R. ..	54,491	2,970,159	53,686	3,089,749
Lehigh & Sus. R. R.....	37,449	1,536,975	37,923	1,524,594
" " Canal	16,179	703,912	21,290	725,497
Scranton North.....	15,348	729,013	15,510	862 866
" " South.....	17,321	1,867,450	37,948	1,939,410
Penn. Coal Co., rail.....	25,737	1,103,386	18,115	1,119,730
" " " canal....	244	6 241	...	7,927
Del. Hud C Co. Canal	32,878	1,369,033	22,428	1,358,652
" " East...	7,402	479,339	7,601	377,416
" " West...	8,761	387,254	13,961	534,435
" " South.	5,124	351,448	827	167,577
Shamokin.....	14,427	625,979	9,849	586,283
Trevorton.....	....	....	....	....
Lykens Valley Coal Co....	....	....	....	....
Wyoming North.....	....	....	....	....
Wyoming South.....	....	....	....	....
P. N. Y. C. & R. R. Co..	7,646	572,739	12,793	674,653
Williamstown Col'y.....	....	.....	....	....
Big Lick Col...	....	.....	....	....
Total..	331,076	17,698,896	371,141	18,637,863
1872			331,076	17,698,896
Increase			40,065	938,967
Decrease.....				

These figures are for the week and fiscal period commencing Nov. 30

† Lerncoal transported for Company's use and Bituminous coal.

Bituminous Coal Trade, 1872 and 1873.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending Nov. 22, 1873, compared with week ending Nov. 23, 1872.

COMPANIES.	1872. Week.	1872. Year.	1873. Week.	1873. Year.
C. & O. Canal.....	5,151	606,128	17,759	624,750
B. & O. R. R.	29,734	1,144,090	31,068	1,359,120
Penn. S. Line..... ..	2,177	7,598	3,505	98,852
H. & B. T. R. R.....	6,599	269,610	11,620	416,848
*Harrisburg & D.....	5,355	433,869	6,949	306,418
*L. V. R. R....	475	26,685	197	27,848
P. & N.Y.C. & R. Co.....	4,753	331,414	6,110	288,053
{Cumberl'd Branch Canal.	3,217	200,085	4,351	133,043
" Railroad....	484	21,643	1,518	79,982
Total.....	57,945	3,041,122	83,077	3,333,914
	....		57,945	3,041,122
Decrease.....	....			
Increase	....		26,132	292,792

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, Nov. 22, 1873.

BY RAILROAD.—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons.	Cwt.
From St. Clair.	35,778 06	
" Port Carbon.	4,491 19	
" Pottsville.	3,310 06	
" Schuylkill Haven.	32,134 14	
" Pine Grove.	6,532 02	
" Tamaqua.	10,927 09	
" Harrisburg.	....	
" Dauphin.	4,811 13	
Total	97,986 08	

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	9,376 02	
" Mill Creek "	190 07	
" Schuylkill Valley Scales	707 09	
" Mt. Carbon "	1,291 00	
" Cressona "	7,094 11	
" Pine Grove "	....	
" Tamaqua "	1,636 19	
Total	20,874 11	

SHIPPED WESTWARD VIA CATAWISSA AND WILLIAMSPORT BRANCH AND NORTHERN CENTRAL RAILROAD.

Via Catawissa & Williamsport Br.	318 09	
" N. C. R. R. passing Locust Gap.	416 00	
" " " Shamokin.	3,963 12	
" " Herndon.	....	
Total	4,698 01	

SHIPPED WEST OR SOUTH FROM PINE GROVE

Via Schuylkill & Susquehanna R. R.	1,583 17	
" Lebanon & Pine Grove Branch	1,198 10	
Total	2,782 07	

CONSUMED ON LATERALS.

From Frackville Scales.	1,310 15	
" Mill Creek "	373 19	
" Schuylkill Valley Scales.	441 19	
" Mt. Carbon "	827 12	
" Cressona "	235 00	
" Pine Grove "	134 04	
" Tamaqua "	294 10	
Total	4,317 19	

LEHIGH AND WYOMING COAL.

Received via Silverbrook Junction, Sent East	3,071 10	
Cat. & Wpt. Br. Sent West	....	
" " Rupert, Cat. & Wpt. Br.	....	
" " Allentown R. Penn'a Br.	....	
" " Alburtis, " "	....	
" " Oreland, G. & N. Br.	498 07	
" " Willow Street R. R.	225 00	
Total	3,856 17	

BITUMINOUS.

From Harrisburg.	6,928 18	
" Connecting R. R., G. & N. Br.		
" Junction R. R.	20 00	
Total	6,948 18	

COAL FOR COMPANY'S USE.

Anthracite	6,695 14	
Bituminous	273,16	
Total	7,869 10	

RECAPITULATION.

	Total for Week.	Corres-p'g week last year.	Increase and Decrease.
Passing over Main Line and Leb. Val. Branch	97,986 08	78,085 13	i 19,900 15
For Shipment by Canal	20,296 08	22,278 14	d 1,982 06
Shipped Westward via Northern Central R. R.	4,698 01	8,751 03	d 4,053 02
Shipped West or South from Pine Grove	2,782 07	1,965 16	i 816 11
Consumed on Laterals	4,317 19	5,382 11	d 1,064 12
Lehigh and Wyoming Coal	3,856 17	6,653 05	i 2,203 12
Total Anthracite paying freig't	138,934 00	123,117 02	i 15,820 18
Bituminous	6,948 18	5,354 17	d 1,594 01
Total of all kinds paying freig't	145,886 18	128,471 19	i 17,414 19
Coal for Company's use	7,869 10	6,738 06	i 1,131 04
Total Tonnage for Week	153,756 08	135,210 05	i 18,546 03
Previously this year	5224626 05	5933491 19	i 291,134 06
Total to date	6378482 13	6068902 04	i 309,580 09

SHIPPED BY CANAL.

From Schuylkill Haven	19,598 00	20,606 10	d 1,008 10
" Port Clinton	1,929 00	2,659 00	d 730 00
Total Tonnage per Week	21,527 00	23,265 10	d 1,738 10
Previously this year	699,774 07	796,734 03	d 96,959 13
Total to date	721 301 07	819,999 10	d 98,698 03

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, Nov. 22, 1873.

	WEEK.	SEASON.
North	43,414 14	2,431,089 07
South	827,05	167,577 00
Total 1873	44,241 19	2,598,666 07
Corresponding time in 1872:		
North	37,296 10	2,305,001 12
South	5,133 14	351,447 16
Total, 1872	42,430 04	2,656,449 08
Increase North		
Decrease North		
Increase South		
Decrease South		
Increase		57,783 01
Decrease		

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending Nov. 22, 1873.

	1873. WEEK.	1873. YEAR.	1872. WEEK.	1872. YEAR.
Railway	18,114 15	1,119,729 14	25,737 02	1,103,386 09
Canal	.....	7,927 11	244 05	6,241 18
	18,114 15	1,127,657 05	25,981 07	1,109,627 07
Increase, 1873	18,029 18			

Lykens Valley Coal Company.

Shipments of coal from Lykens Valley Coal Co., for week ending Nov. 2, 1873.

For week ending Nov. 22, 1873	858 15
Total shipment to date	.....

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending Nov. 22, 1873, with Totals to date, compared with same time last year.

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt.
Total Wyoming	21,200 18	862,574 18
" Hazleton	35,408 16	2,094,046 05
" Upper Lehigh	60 16	2,020 19
" Beaver Meadow	9,152 10	621,851 14
" Mahanoy	9,813 08	487,932 00
" Mauch Chunk		3,211 15
Total	75,636 08	4,074,537 01
Same time last year	66,737 01	3,800,751 15
Increase	8,899 06	273,785 06
Decrease	.....	.....
Forwarded East from Mauch Chunk by rail	54,480 14	3,099,748 12
Same time last year	54,480 14	2,970,158 15
Increase	.....	119,589 17
Decrease	774 05	.....
DISTRIBUTED AS FOLLOWS.		
Local East of Mauch Chunk	1,271 10	77,124 13
Forwarded East for use L. V. R.	937 08	50,991 11
Delivered to Furnaces and Manufacturing Companies	7,506 03	647,202 01
Delivered to Cat & Fog. R. R.	141 03	7,289 18
" " East Penn R. R.	51 03	8,630 02
" " North Pennsylvania Railroad	4,730 08	301,817 12
" " Port Del	5,3.9 04	207,363 09
" " East Amboy Railroad		
" " Morris and Essex Railroad	4,894 00	265,082 15
" " Bel Del Railroad	20,975 08	1,018,047 17
" " Central Railroad	7,847 02	505,218 18
Delivered at and above Mauch Chunk for use of L. V. R. R.	1,367 05	66,363 06
To P. & N. Y. R. R.	11,407 12	475,347 14
To Northern Central R. R.	447 19	23,157 11
To D. H. & W. R. R.	296 12	21,177 18
To L. & S. R. R. at Packerton for rail	181 18	13,873 13
To Individuals at Mauch Chunk	107 19	2,586 16
To Individuals above Mauch Chunk	582 13	16,328 00
To L. & S. R. R., at Penn Hav., for railroad		1 541 10
Do. for canal	4,591 14	189,146 13
To Lehigh Canal Mauch Chunk	2,905 07	79,405 00
To Catawissa Railroad	15 00	110 09
To L. & B. R. R. at Lack. Junc.		85,710 05
Total	75,636 08	4,074,537 01

Report of Coal Transported over the Lehigh Canal

For the week ending Nov. 21, 1873.

REGIONS SHIPPED FROM.	TIDE. tons, ct.	LOCAL. tons, ct.	TL. WEEK tons cwt.	TL. DATE tons, cwt.
Mauch Chunk Region	201 00	1,098 15	1,299 15	205,983 01
Mauch Chunk Region Hazardville	793 16	683 10	1,477 06	27,503 04
Beaver Meadow Region	677 14	3,375 00	4,052 14	130,174 16
Mahanoy Region		742 08	741 08	19,822 07
Hazleton Region	392 16	5,749 14	5,642 10	195,893 07
Upper Lehigh Region	101 10	1,263 13	1,364 13	29,241 19
Wyoming Region	5,090 08	1,640 13	6,711 01	112,130 08
Wyoming Region, Hazardville				4,282 09
Total,	7,236 14	14,053 13	21,290 07	725,036 11
Previously reported	250231 11	453514 13	703746 04	
Total to date	257468 05	467568 06	725036 11	
Corresponding week last year	284759 08	469152 14	753912 02	
Increase				
Decrease	28,291 03	1,584 08	28,875 11	

DISTRIBUTION.	WEEK 1873.	WEEK 1872.	YEAR. 1873.	YEAR. 1872.
Consumed on line of Lehigh Canal	3,404 02	2,827 18	78,606 00	77,585 19
Passed into Morris Canal to Tidal Points		65 10	2,613 17	5,081 05
Passed into Morris Canal to Local Points	139 16	141 10	28,213 05	23,371 02
Passed into Del. & Rar. Canal to Tidal Points	7,236 14	4,888 00	251,954 08	279,678 03
Passed into Del & Rar. Canal to Local Points	591 08	97 17	13,375 01	14,328 06
Consumed on line Delaware Div. Canal	1,214 10	1,356 17	39,276 05	46,343 01
Passed through to Bristol	8,704 02	6,801 17	307,976 15	307,524 06
	21,290 07	16,179 09	725,036 11	753,912 02

Report of Coal Transported over Central R. R. of N. J. (Lehigh and Susq. Div.)

Week ending Nov. 22—Compared with same time last year.

REGION SHIPPED FROM.	TIDE. tons ct.	LOCAL. tons ct.	CANAL. tons ct.	TL WEEK tons cwt.	TL. DATE tons. cwt.
Wyoming	26389 03	7948 05	5485 12	39822 00	1636566 07
Upper Lehigh	....	3046 08	1247 11	4293 19	178169 17
Beaver Meadow	3778 14	2270 05	2236 19	8285 18	340659 09
Hazleton		247 07	4542 06	4789 13	200222 14
Mauch Chunk	121 12	554 12	362 15	1038 19	47897 4 16
Total	30289 09	14066 17	13875 03	58231 09	2794693 03
Prev'ly reported	1303421 15	835607 05	597232 14	2736161 14	
Total to date	1333711 04	849674 02	611107 17	2794693 03	
Same time 1872	1063680 06	791252 18	484293 11	2339226 15	
Increase	270030 18	58621 04	126814 06	455466 08	
Decrease					

DISTRIBUTION.	WEEK 1873.	WEEK 1872.	YEAR 1873	YEAR 1872.
Forwarded East by Rail to Tidal points	30289 09	14360 16	1333711 04	1063680 06
Forwarded East by Rail to Local points	5780 14	11246 07	399083 15	393266 16
Forwarded East by Rail use Central Division	1634 19	1551 01	80777 13	71060 15
Forwarded East by Rail use L. & S.	218 07	290 14	16722 02	7977 12
Delivered at and above Mauch Chunk	2208 18	1662 17	75886 01	55095 10
Delivered at Coalport & Hazard for Canal	13875 03	7391 12	645195 00	526692 07
Delivered to L. V. R. R. at Packerton	219 01	213 19	20928 17	13454 06
Delivered to L. V. R. Rd. at Sugar Notch	3423 14		90568 09	
Delivered to L. & B. R. R. at Plymouth Bridge	581 04	3891 10	137220 02	208 09 03
Total	58231 09	40608 16	2794693 03	2339226 15

Penn. and N. Y. R. R.—Coxton, Pa.

Coal tonnage for week ending Nov. 22, 1873.

	Week. Tons. Cwt.	Total. Tons. Cwt.
Anthracite received :		
From Lehigh Valley R. R.	11,407 12	475,347 14
" Lack. & B. R. R.	312 16	36,747 11
" Pleasant Valley R. R.	.....	127,965 08
" Sul. & Erie R. R.	708 19	34,592 03
Total	12,790 10	674,652 16
Same time last year	7,646 01	572,793 00
Increase	5,144 09	101,859 16
Decrease	.....	
Distributed :		
To Lehigh Valley R. R.		24,004 13
To Lack. & B. R. R.		1,443 0
To S. Central R. R.	2,285 05	153,928 12
To Ithaca & A. R. R.	4,784 09	141,222 19
To Erie R. W. Pockets for shipm't.	2,571 15	239,672 16
To Erie Railway, Watkins direct	596 07	12,687 18
To individuals on line of road	1,212 01	29,934 05
To points at & above Coxton for use of Co.	588 13	25,501 09
To points between Waverley and Elmira	779 00	46,256 19
Total	12, 90 10	674,652 16
Bituminous received from BARCLAY R. R.		
Shipped north from Towanda	6,018 09	285,619 01
Shipped south from Towanda	91 02	2,049 12
Northern Central R. R.	....	384 09
Total	6,109 11	288,053 02
Same time last year	4,753 07	331,414 08
Increase	1,356 04	
Decrease		43,361 06
Distributed :		
To Erie Railway	5,580 05	262,802 07
To So. Central R. R.	451 07	22,198 11
To Ithaca Valley R. R.	6 17	548 18
Lehigh Valley, R. R.	56 15	1,135 00
To individuals on line of Railroad.	34 07	1,250 02
To points on line of road for use of Company	....	118 04
Total	6,109 11	288,053 02
Grand totals transported ;		
Anthracite	12,790 10	674,652 16
Bituminous	6,109 11	288,053 02
Total	18,900 01	962,705 18
Same time last year	12,399 08	904,207 08
Increase	6,500 13	58,498 10
Decrease	.....	

Prices of Coal by the Cargo.

(CORRECTED WEEKLY.)

Company Coals.

Dec. 1873.

	L.	Str.	Gra.	Eg.	Sto.	Chest
*Pittston at Newburgh	4 60	4 60	4 70	4 80	5 10	4 50
*Lackawana at Rondout	5 05	5 15	5 25	5 40	5 70	5 05
Wilk'b're at Pt. John'n	5 05	5 15	5 25	5 40	5 70	5 05
Old Co. Lehigh at Pt. John'n	6 00	5 85	5 85	5 95	5 20	—
New York Coal Exchange	5 85	5 70	5 75	5 85	5 15	—
AT PHILADELPHIA.						
Hard White Ash	4 60	4 60	4 70	4 70	5 00	3 95
Free B'rn'g White Ash Coal	4 60	4 60	4 70	4 70	5 00	3 65
Schuylkill Red Ash	— —	— —	4 70	4 85	5 15	3 95
Alaska Red Ash	— —	— —	4 70	4 70	5 00	3 95
Shamokin White Ash	— —	— —	4 80	5 00	5 20	4 10
North Franklin	— —	— —	5 20	5 20	5 10	4 00
Lorberry	— —	— —	5 50	5 50	5 50	4 35
Lykens Valley	— —	— —	— —	6 10	6 10	4 75
SHIPPED FROM ELIZABETHPORT, HOBOKEN AND TRENTON.						
L. C and N. Co., Newport	— —	— —	5 35	5 50	5 70	5 10
" " Plymouth Red Ash	— —	— —	5 5	5 60	5 80	5 10
" " Room Run	5 85	— —	5 70	5 70	5 95	5 15
Honeybrook Lehigh	5 90	— —	5 80	5 85	5 90	5 20
Fulton, "	6 10	— —	5 85	5 85	5 95	5 20
Scranton	4 15	5 10	5 20	5 55	5 65	5 00

For freights to different points see "Freights."
*To contractors only.

Prices at Baltimore—Dec. 1873.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 05@5 70
Pittston and Plymouth, do	75@6 00
Shamokin Red or White Ash, do	00@6 25
*Lykens Valley Red Ash, do	@6 80
By retail, all kinds per ton of 2,240 lbs	7 50@8 50
*George's Creek and Cumberland f. o. b. at Locust Point for cargoes	4 85@5 00
West Va. Gas Coal	6 50
Youghigheny gas f. o. b. at L. Point, nominal	7 50
Kanawha Cannel, coarse	@12 50

* Freight to New York $2 15.

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein, f. o. b. at Phila	$
Lemon " " "	
Cumberland Vein Coal	
Tyrconnel f. o. b.	$7 00

Prices at Georgetown, D.C., and Alexandria, Va.

Dec. 1873.

George's Creek and Cumberland f. o. b. for shipping $4 60@4 75

Prices at Havre de Grace, Md.

Dec. 1873.

Wilkesbarre and other White Ash for Cargoes	$— —@5 00
Lykens Valley	— —@6 50
Shamokin Red or White Ash	— —@5 25

Bituminous Coals (Cumberland).

Georgetown, F. o. b.	$4 60
Baltimore "	5 00
New York "	7 25@7 50
South Amboy "	6 80

Prices of Foreign Coals.

Dec. 1873.

Duty 75 c. per ton.

Corrected weekly by ALFRED PARMELE, No. 32 Pine street, N. Y.

Liverpool Gas Oaking	16 00@18 50
" " Cannel	13 00@18 00
" House "	20 00@21 00
" Orrel	20 00@— —
Per ton 2,240 lbs., ex-ship.	
PRICES FROM YARD.	
Liverpool House Orrel, screened	$20 00@22 00
"Cannel, "	21 00@25 00
Per ton 2,000 lbs. delivered.	

Prices of Gas Coals.

Dec. 1873.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr., 41-43 Pine st., N. Y

	Coarse	Slack
Block House, f. o. b. at Cow Bay	$2 75	$1 25
Gowrie	2 25	0 00

Corrected by Bird, Perkins & Job, 27 South street.

	Coarse.	Culm of Coal,
Pictou nett	$3 00	1 50
Sydney	3 25	1 00
Lingan	2 75	1 00
Caledonia	2 75	1 25

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty on all slack coal or Culm : 40c. per ton of 28 bushels, 80 pounds to the bushel. On all bituminous coal or shale : 75 cents per ton of 28 bushels.

AMERICAN.		Nominal quo Currency.
Westmoreland	f. o. b.	$6 00 @7 00
Fairmount Gas Coal Co. of N. Y.	"	6 50 @7 00
Despard Coal Co.	"	6 50 @7 00
Penn.	"	6 50 @7 00
Newburg Orrel Gas	"	6 50 @7 00
West Fairmount Gas Coal	"	6 50 @7 00
Redbank Cannel, at Pa.	"	12 00 @0 00
AT PHILADELPHIA		
Westmoreland		7 50 @0 00

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven Lump and St., net, $1 60; Br., Egg and Ch., $1 65; Stove, $1 75
Shipping at Pt. R., 20c., for use at Phil., $2 18 from Pt. Carbon.

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 72
C. R. R., N. J., Phillipsburgh to Elizabethport	06
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$2 23

MAUCH CHUNK TO PORT JOHNSTON.

L. V. R. R., or L. & S. R. R. from M. C. to Phillipsb'g	$0 72
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	1 06
Shipping expenses	25
Wharfage	10
Total	$2 23

TO HOBOKEN

L. V. R. R., Mauch Chunk to Phillipsburgh	72
Morris & Essex R. R. Phillipsburgh to Hoboken	6
Shipping expenses	25
Wharfage	00
Total	$2 23

TO SOUTH AMBOY.

L. V. R. R.	
B. & D. R. R.	$1
Cam. & Am. R. R.	
Shipping Expenses	35
Total	$2 23

PENN HAVEN TO ELIZABETHPORT.

L. V. R. R. Penn Haven to Phillipsburgh	84
C. RR. of N. J. Phillipsburgh to Elizabethport	1 06
Shipping expenses	15
Wharfage	20
Total	$2 25

Freights.—Dec. 1873.

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore	Anthracite. From Elizabethport, Perth Amboy, Weehawken, and Hoboken.	Anthracite. From Newburgh.	Anthracite. From Rondout.
Amesbury	— —	— —	— —	— —	— —
Bangor	— —	— —	— —	— —	— —
Bath	— —	2 85	— —	— —	— —
Boston	3 10	2 75	2 15*	2 25	2 15
Bridgeport	— —	2 50@—	90	1 90	— —
Bristol	— —	— —	1 25	1 35	— —
Cohassett Narrows	— —	— —	— —	— —	— —
Duxbury	— —	— —	1 25†	1 35	— —
Edgarton	2 70	— —	— —	— —	— —
East Cambridge	— —	— —	2 20	2 30	2 15
Fall River	2 60	2 60	1 25	1 35	— —
Hackensack	— —	— —	— —	— —	— —
Hartford	— —	— —	1 40	1 50	— —
Hoboken	2 15	— —	45	55	— —
Jersey City	2 15	— —	45	55	— —
Lynn	— —	— —	— —	— —	— —
Middletown	— —	— —	1 20	1 30	— —
Mystic	— —	— —	1 25	1 35	— —
New Bedford	— —	2 60@2 65	1 25	1 35	— —
Newburyport	— —	3 00@—	2 30	2 40	— —
New Haven	— —	2 50@—	90	1 00	— —
New London	— —	2 60@—	1 10	1 20	— —
Newport	— —	— —	1 25	1 35	— —
New York	2 30	2 00	45	55	— —
Norwalk	— —	— —	90	1 00	— —
Norwich	— —	— —	1 25	1 35	— —
Pawtucket	— —	— —	1 32‡	1 45‡	— —
Portland	3 10	2 75	2 10	2 20	— —
Portsmouth, N. H	3 20	2 90	2 30	2 40	— —
Providence	2 60	2 60	1 25	1 35	— —
Rockport	— —	— —	— —	— —	— —
Saco	— —	— —	— —	— —	— —
Sag Harbor	— —	— —	1 15	1 25	— —
Salem	— —	2 75@3 00	2 15	2 25	— —
Stamford	— —	— —	90	1 00	— —
Stonington	— —	— —	1 20	1 30	— —
Taunton	— —	— —	1 75	1 85	— —
Warren	— —	— —	1 25	1 35	— —
TO RIVER PORTS					
Albany	— —	— —	— —	— —	— —
Catskill	— —	— —	— —	— —	— —
Cockseackie	— —	— —	— —	— —	— —
Coeyman's	— —	— —	— —	— —	— —
Cold Spring	— —	— —	— —	— —	— —
Fishkill	— —	— —	— —	— —	— —
Haverstraw	— —	— —	— —	— —	— —
Hudson	2 65	— —	— —	— —	— —
New York vessels	— —	— —	— —	— —	— —
Nyack	— —	— —	— —	— —	— —
Poughkeepsie	— —	— —	— —	— —	— —
Rhinebeck	— —	— —	— —	— —	— —
Rondout	— —	— —	— —	— —	— —
Saugerties	— —	— —	— —	— —	— —
Sing Sing	— —	— —	— —	— —	— —
Stuyvesant	— —	— —	— —	— —	— —
Tarrytown	— —	— —	— —	— —	— —
Troy	— —	— —	— —	— —	— —
West Point	— —	— —	— —	— —	— —
Yonkers	— —	— —	— —	— —	— —

† 3 c. per bridge per ton in addition to freight.
† New Haven rate and towing 25 c. extra per ton
‡ Towing from Providence and return, extra,
‖ And Towing.

St. Thomas	$— — Gold
Martinique	— — "
Demerara	— — "
New Orleans	— — "
Mobile	— — "

MARKET REVIEW.

NEW YORK, Nov. 27, 1873.

IRON—Scotch Pig is without any special activity. There is little or no Eglinton here at present and the holders are asking $40, with a sale of 20 tons at this price. Glengarnock is also in reduced stock and may be quoted steady at $39@$40. Gartsherrie is reduced in stock to less than 100 tons all in one hand, and we are assured by the holder that none has been sold at a less price than $48 cash, or its equivalent. There is some further inquiry for Coltness at low prices, but we hear of no sales. American Pig is very quiet; the price of No. 1 Lehigh brands is now $32, at which price 200 tons Allentown changed hands; No. 2 may be quoted $28@$29, and Gray Forge $25@$27. There has been no business in either old or new Rails. Scrap is also quiet, $35 is about the asking price for lots from yard, and $23 for parcels from dock. 60 tons old Metal and Iron sold at $30 for Wrought and 1 cent per lb. for Cast; 5000 lb., a mixed lot, and 100 tons No. 1 Wrought, on private terms. Refined Bar is still quiet, but nominally unchanged, though buyers have the advantage.

LEAD—Pig is quiet; Ordinary Foreign is held at 7 cents, and Domestic 6¼@6¼ gold. Bar 9¼ cents. Sheet and Pipe, 10½.

The annual meeting of the American Iron and Steel Association which was held in Philadelphia on the 20th inst., estimates the following as the production of the Merchant Bar Plate, Rolling, and other mills, exclusive of Rail mills:—

	1872.	1873.
Merchant Bar, and Rod	650,000	400,000
Sheet and Plate	200,000	250,000
Hoop	30,000	30,000
Nails and Spikes	175,000	200,000
Axles, &c.	95,000	100,000
Total, net tons (2000 lb.)	1,000,000	980,000
Add Iron and Steel Rails	941,992	850,000
Total Rolled Iron, net tons	1,941,992	1,830,000

The estimated product in 1871 of Rolled Iron other than Rails was given by the Association at 710,000 net tons. The product of the forges and bloomeries of the country, strictly so-called, is estimated at 58,000 net tons in 1872 and 50,000 in 1873.

A summary, in net tons, of the ascertained and estimated production of Iron and Steel in the United States in 1872 and 1873, is as follows:—

	1872.	1873.
Iron and Steel Rails	941,992	850,000
Other rolled and hammered Iron	1,000,000	980,000
Forges and Bloomeries	58,000	50,000
Cast Steel	32,000	28,000
Bessemer Steel	110,500	140,000
Siemens-Martin Steel	3,000	3,500
Pig Iron	2,830,070	2,695,434

The report estimates the mileage of new track for the year 1873 at only 3000 miles, a decrease since last year of more than 50 per cent. The year 1871 witnessed the culmination of railroad construction in this country. The number of miles built in that year was 7779. The reaction commenced in 1872, when 6427 miles were built. The total railroad construction of 1874 is estimated at 3000 miles, the same as the estimate for 1873.

The total annual capacity of the eight Bessemer works now in operation is about 170,000 net tons of Rails, to which add Edgar Thompson and new plant of Pensylvania Steel Works, and the total capacity of the Bessemer works of the United States at the close of 1874 may be placed at 220,000 net tons of Rails.

From the foregoing statistics, it would appear that the present state of the Iron trade is far from being in a satisfactory condition. The causes of the decline in prices, as set forth by the Secretary of the American Iron and Steel Association are to be found, first, in the natural tendency of high prices to restrict consumption, and thus bring about sharper competition; and, second, in the forced subsidence at the close of 1872 of the fever for building Western railroads. In addition to these causes, the panic has contributed largely to the depression. The price of Iron has declined, reaching in some lines of the trade to a point below the cost of production. The blow has been severely felt. But for the heavy importations of foreign Iron after the demand for American Iron had commenced to slacken, there would be more general activity in the American Iron trade to-day.

The Statistics of the imports of foreign Iron for the fiscal years ending June 30, 1872, and June 30 1873, as presented by the last monthly report of the Bureau of Statistics, are interesting and instructive, in this connection. Our importations of Pig Iron, during the fiscal year 1872, amounted to 248,500 tons, while for the fiscal the amount was only 215,000 tons. We imported 166,016,035 lb. of Bar Iron last year, against 236,454,061 lb. the year before. The most marked falling off last year was in Railroad Iron, of which we imported only 481,009,431 lb., against 944,730,806 lb. the year before. There was, however, a marked increase in the importation of Steel Rails, the quantity last year being 320,083,100 lb., valued at $9,199,666, against 245,911,555 lb., valued at $6 277,691 the year before.

COPPER.—The manufactures of Copper are nominal at our quotations; the price of Yellow Metal Bolts has been reduced to 30 cents, cash. Ingot is in fair demand, and the advanced prices are well sustained; sales have been made of 350,000 lb. at 23 cents for Lake, and 22½@22¾ for Baltimore, and 100,000 lb. Lake for future delivery, 24. Old Copper may be quoted 20@23½ cents, and that suitable for chemical purposes, 26½, cash.

TIN.—Pig has become quiet again, but stocks are held firmly, and for Straits a further advance is generally demanded; we quote as the asking prices, Straits, 27½@28 cents; English L. & F., 26¼; Refined English, 27¼, and Banca, 32@32½, gold. Plates have advanced again in England, and, though we do not as yet change the extremes of our quotations, holders ask fully 25 cents per box higher. The stock here is light, and the supply is generally believed to be small throughout the country; there is a stronger feeling than has existed for a long time, rather excited than otherwise. The sales have been to a greater extent than the operators would disclose, but among them, as near as we could ascertain, were the following—say 500 boxes Charcoal Tin at $9 75; 1,000 do. Coke Tin, $7 50; 500 do., $7 62½; 1,000 do., $7 75; 500 do. I. C. W., $7 25; 250 do. Coke Terne, $7 87½; 750 do. Charcoal do., $9 50, all gold; and 250 do. Charcoal Tin, 500 do. Coke Tin, and 500 do. Charcoal Terne, on terms not made public.

SPELTER is very dull. Foreign is nominal at 7½@7¾ cents, gold, and Western at 7½, currency.

STEEL.—The market is very quiet at old quotations; English is in good supply for the demand.

ZINC—Mosselmann Sheet, from agents' hands, is nominally steady at previous quotations. Dealers ask 8¼ cents net gold, for lots from store, with sale of 50 casks on private terms. Manganese black oxide, 2½ cents; Manganese proxide gray, 6 cents.

METALS.

NEW YORK, Nov. 27, 1873.

IRON.—Duty: Bars, 1 to 1¼ cents ₩ lb; Railroad, 70 cents ₩ 100 lbs.; Boiler and Plate, 1¼ cents ₩ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₩ lb; Pig, $7₩ ton; Polished Sheet, 3 cts. ₩ lb; Galvanized 2¾; Scrap Cast, $6; Scrap Wrought, $8 per ton. All less 10 per cent. No Bar Iron to pay a less duty than 35 per cent. ad val.

	Store Prices.
Pig, Scotch—Coltness ₩ ton	38 00@40 00
Gartsherrie	— —@48 00
Glengarnock	38 00@40 00
Eglinton	38 00@40 00
Pig, American, No. 1	30 00@32 00
Pig, American, No. 2	28 00@29 00
Pig, American, Forge	25 00@27 00
Bar Refined, English and American	— —@— —
Bar Swedes, assorted sizes gold	— —@137 50
	Store Prices, Cash.
Bar, Swedes, 1¾ to 5 x ⅜ & ¾ 2 sq. & 6 to 12 x ⅜ & ⅝	175 00@— —
Bar, Refined, ¾ to 2 in. rd. & sq. 1 to 6 in. x ⅜ to 1 in.	86 00@— —
Bar, Refined, 1¼ to 6 by ¼	85 00@— —
Bar, Refined, 2½ to 2¾ round 1 & 1¼ by ¼ & 5:16	87 50@— —
Large Rounds	90 00@105 00
Scroll	100 00@132 50
Ovals and half-round	107 00@127 50
Band	100 00@104 50
Horse Shoe	115 00@— —
Rods, ⅜ to 3-16 inch	90 00@132 50
Hoop	117 50@157 50
Nail rod	8¾@9
Sheet, Russia, as to assortment (gold)	17 @17¼
Sheet, Singles, D. and T. Common	—4½@—5¾
Sheet, D. and T. Charcoal	—6¾@—8
Sheet, Galv'd, list 10 per cent, discount	— —@— —
Rails, English (gold) ₩ ton	60 00@— —
Rails, American, at Works in Pennsylvania, currency	63 00@— —

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ₩ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ₩ lb	35 @— 38
Copper Bolts	37 @— 40
Copper Braziers, 16oz. and over	37 @— 40
Copper Nails	42 @— 45
Copper, Old Sheathing, &c. mixed lots	20 @— 23
Copper, Old, for chemical purposes, 14@16 oz.	— @— —
Copper, American Ingot, Cash	23 @— —
Copper English Pig	— @— —
Yellow Metal, New Sheathing & Bronze	22 @— 25
Yellow Metal Bolts	30 @— —
Yellow Metal Nails, Sheathing and Slat'g	24 @— 26

LEAD.—Duty: Pig, $2 ₩ 100 lbs.; old Lead, 1½ cents ₩ lb Pipe and Sheet, 2½ cents ₩ lb.

Spanish (gold)	6 87½@— —
German, do.	6 87½@— —
English do.	6 87½@7 50
Foreign, Refined	7 25 @7 50
Domestic do.	6 50 @6 12½
Bar (net)	9 25 @— —
Pipe (net)	— —@10 50
Sheet	— —@10 50

STEEL.—Duty: Bars and ingots, valued at 7 cents ₩ lb or under 2¼ cents; over 7 cents and not above 11, 3 cents ₩ lb; over 11 cents, 3½ cents ₩ lb, and 10 ₩ cent ad val. Store prices.

English Cast (2d and 1st quality) ₩ lb	— 17 @— 21
English Spring (2d and 1st quality)	— 9¾@— 10½
English Blister (2d and 1st quality)	— 14 @— 18½
English Machinery	— 14½@— —
English German (2d an 1st quality)	— 12½@— 14½
American Blister "Black Diamond"	— —@— 11½
American, Cast, Tool do.	— —@— 17
American, Spring, do.	— —@— 11
American Machinery do.	— 11¼@— 12
American German, do	— 9 @— —

TIN.—Duty: Pig, Bars, and Blocks, 15 ₩ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₩ cent.; Roofing 25, ad val.

	Gold ₩ lb.
Banca	32 @32½
Straits	27½@28
English	26¼@—
English Refined Gold	27¼@—

PLATES. Fair to Good Brands.	Gold.	Currency
I. C. Charcoal, ₩ box	$ 9 50 @10 00	$10 75 @11 25
I. C. Coke	7 50 @ 7 75	8 50 @ 9 00
Coke Terne	7 75 @ 7 50	7 75 @ 8 50
Charcoal Terne	9 25 @ 9 75	10 50 @11 00
SPELTER—Duty: In Pigs, Bars & Plates,		$1.50 p. 100 lb
Plates, Foreign (gold) p. 100 lb.		7 37½@—7 75
Plates, Domestic p. lb.		7½@—11
ZINC—Duty: Pig or Block, $1.50 per 100 lb.; Sheet 2½c. per lb		
Sheet per lb.		—8¼ @ 10

American Institute of Mining Engineers.

OFFICIAL BULLETIN.

Announcements to Members and Associates.

I. The ENGINEERING AND MINING JOURNAL, which is the Organ of the Institute, and contains its proceedings, transactions and notices of meetings, will be sent to each Member and Associate on the payment of his annual dues. Back numbers cannot, as a rule, be sent.

II. Dues are payable in advance at the annual (May) meeting. Remittances should be made, as far as possible, by P. O. Order, payable to the Secretary.

III. The first volume of Transactions of the Institute is in course of preparation and will be sent, as soon as issued, to all members not in arrears.

THOMAS M. DROWN, Secretary.
1123 Girard street, Philadelphia, Pa.

MISCELLANEOUS.

EDWARD SAMUEL,
Iron Broker and Commission Merchant,
332 WALNUT STREET, PHILADELPHIA.

Solicits consignments and orders to purchase or sell American or Foreign Raw or Manufactured Irons.
Dec, 31:tf

ISIDOR WALZ, Ph.D.
ANALYTICAL AND CONSULTING CHEMIST
No. 18 EXCHANGE PLACE,
NEW YORK.

United Royal Smelting Works
OF THE
Kingdoms of Prussia and Saxony.
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During a temporary absence of Mr. H. ROBERTSON, and until further notice, all communications should be addressed to
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THE ENGINEERING AND MINING JOURNAL.

ROSSITER W. RAYMOND, Ph. D.
JOHN A. CHURCH, E. M. Editors.

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THERE is a proposition among the Cornish tin miners to form a co-operative smelting company, as they are very much dissatisfied with the result of the present system. They deliver their ore, but get no price for it until the smelters have completed their weekly engagements for the delivery of metal, and then the miners are paid a sum which bears a certain proportion to the market price of the tin. The smelters have not sufficient incentive to keep the market steady, as the miners alone suffer the consequences of a decline. A gentleman, who has been looking into the subject, says that no smelter "durst hold a ton of tin beyond the time for smelting it and sending it away, and, if at the time it would not sell for £102 it must go for £100." This state of things he proposes to remedy by smelting works managed in the interest of the mine companies. He seems to have a very decided fear of the existing smelters, who are very powerful in their field and completely control it.

THE occurrences in Cuba, with the light thrown upon the condition of our Navy and the necessity of abandoning the policy that has made it useless for immediate action, will probably result in some relief to the iron business in such places as Philadelphia and Wilmington. Mr. ROACH, ship-builder of Philadelphia, has received contracts for building engines and machinery for three new sloops of war, at a total cost of more than $1,000,000; engines and machinery for the *Tennessee*, $300,000; repair of 4 monitors, $720,000; engine for torpedo boat, $200,000, and 2 other engines, $360,000; a grand total of about two and a half million dollars. Other builders have also received contracts. These sums are small when compared with the whole iron trade or even with the late decrease in the amount of that trade, but they are sufficiently large to set a great number of men at work, and, by the mysterious effect of an example, to make a considerable improvement in the condition of local industries at least.

THE Hoosac Tunnel is at length finished, so far as complete penetration of the mountain is concerned. At 3.13, on Thanksgiving afternoon, the last heading was blown away. The dividing wall had been reduced to eleven feet. One central hole was bored entirely through this, and around were grouped a number of eight foot holes, on each side. The latter were charged, and the electric wires of both sets of shots were connected by means of the center hole. One turn of the electric machine and the whole charge exploded with such violence that one mass of rock, weighing fully a ton, knocked down the strong gates placed as a barrier 300 feet distant. A very perceptible little breeze, arising from the gasification of the nitro-glycerine, swept through the tunnel. A breach 5 by 4 feet had been made by the shots, and through this, Hon. ROBERT JOHNSON of Boston, State Senator and Chairman of the Legislative Committe on the Tunnel, passed, followed by Mr. SHANLY, the contractor, through whose energy the great work has been completed.

OUR contemporaries, including even such highly respectable journals as the *United States Railroad and Mining Register* and the *Iron Age*, have a bad habit of copying from our columns the papers read before the American Institute of Mining Engineers, and giving credit to the Institute, but not to us. This is perhaps a small matter—too "small," indeed, to be worthy of the journals we have named; and no doubt the mention of it on our part will be quite sufficient. It would be easy for us, as the organ of the Institute, to copyright the reports of its proceedings and papers which we print, with much pains and care, for the benefit of the members and the public. But this we are not inclined to do. The more these things are circulated, the better; only, we ask the usual courtesy of credit to the JOURNAL for their first publication. The *Coal and Iron Record*, of this city, recognizes this point, and duly credits to us the valuable paper of Mr. EILERS, on "Coke from Lignites"—for which it will please accept our thanks.

WE find in the *Coal and Iron Record* an earnest approval of the movement for a collection of samples and analyses of American iron ores, to be exhibited at the Centennial Exposition, and a very hearty and well-deserved recommendation of Mr. RICHARD P. ROTHWELL, as the proper person to superintend the work. We cannot join in this recommendation, for the simple reason that we cannot spare Mr. ROTHWELL, who has just accepted a position upon our editorial staff, and is about to assume the charge of the Coal and Iron department of the ENGINEERING AND MINING JOURNAL. Further announcement of our plans based upon this important accession to our editorial force, will be made in our next number. Meanwhile, although we concur in the praise bestowed upon Mr. ROTHWELL (if we didn't, we shouldn't have engaged him!) it is but simple justice to say that he is not, as our contemporary declares, "the only one of our American engineers who took the trouble or pains to have this country represented in her mineral wealth at the Vienna Exposition." Messrs. EGLESTON, MAYNARD, PECHIN, WOLTERS, and others, whose names we do not at present recall, are entitled to a share of this praise, to say nothing of the much abused Northern Pacific Railroad Company, the very handsome display of which included ores and coal as well as maps, oats and mammoth vegetables.

THE Mexican Government, after hesitating long over the representations of Messrs. ROSECRANZ and PLUM, rival bidders for the privilege of building railroads in Mexico, has finally cast them both off and given its grant to men of its own country. The concession is for a road from the Rio Grande to the City of Mexico, and thence to the Pacific, and includes a scheme which cannot fail to be of great advantage to the country if it is carried out. We hardly know whether to condole with, or congratulate, the defeated American rivals. Mexico is so poor a country that a railroad through it would be only another Pacific road, so far as local support is concerned. A community in which the price of a day's wages is half a dollar, which raises on its own lands nearly all it consumes, and in which horses are abundant, and time of little value, is hardly the one on which to build hopes of great railway dividends. Mexico would have to step up to a new level in wages and personal expenses, before local travel could afford any support to the road. Freights would be almost its sole dependence, but for those it could charge high rates, as its only competitors would be mule and ox teams. But when we look at Mexico in general, it is impossible to deny the great benefit it may receive from the establishment of railway lines through its States. Mexico has all that is necessary to enable it to reassume its former very important position as a producer of metals, with the sole exception of the conveniences and blessings which rapid and cheap intercommunication brings in its train. With all its lawlessness, and a reputation which shuts it out from the best markets of capital in the world, and relying almost entirely upon its own energies, it produces an amount of bullion which proportionately exceeds that of our own more business-like community. This amount can and would be rapidly increased if foreigners were assured of protection, or if Mexicans would lay aside the traditions of centuries ago, to wake up to the fact that they are far behind the age.

The Excursions of the Easton Meeting.

AMONG the many delightful features which characterized the Easton meeting of the American Institute of Mining Engineers, the various excursions of the Institute to the metallurgical works of the vicinity, and of other towns, are to be reckoned. To describe at length these pleasant experiences would make too great a requisition on the space at our disposal. We can only express in general terms our sense of the great pleasure and profit accruing to every member of the Institute present an these occasions, and add a few notes and reminiscences which may be interesting to those who were not present.

Very instructive was the visit paid by the Institute to the Warren Pipe Foundry in Phillipsburg, N. J., where the Superintendent, Mr. JOHN INGHAM, courteously exhibited and clearly explained the curious process and machinery involved in the casting of pipes of all sizes, up to a diameter of more than four feet. Formerly, it was not possible to cast long lengths of iron pipe in a vertical position, owing to the difficulty experienced in properly varnishing the interior of the moulds. Consequently, the horizontal method of casting was employed, although in other respects less suitable. By a very simple and ingenious device, Mr. INGHAM is now able to give instantly to the interior of the vertical moulds the necessary coating of black wash, and this simple discovery has revolutionized the pipe-founding business. The device alluded to consists of a plug suspended by a string, which is lowered into the mould to a certain depth. The

wash is then poured in above the plug, which is subsequently allowed to drop through the mould, followed by the wash, of which, during this passage, the interior surface of the mould takes up exactly the proper amount. The operations of preparing moulds and cores, and the casting of pipes of the largest size, were witnessed with great interest by the members. The casting-house contains some peculiar cranes, invented by Mr. INGHAM, which are notably simple, rapid, and effective in operation, being easily controlled by hand. Another remarkable invention of this gentleman is a machine used in these works for twisting and winding the straw ropes employed in the casting, which reflects great credit upon his ingenuity and mechanical skill.

From the Warren Pipe Foundry, the Institute proceeded to the Andover Iron Works, of which Mr. J. C. KENT, one of the members, is Superintendent. The large and systematic operations carried on at these works deserve a more thorough description than we can undertake to give at present; but a few notes, for which we are indebted to Mr. WILLIAM St. G. KENT, may be here introduced as certainly trustworthy, and satisfactory, so far as they go. The Andover Iron Company's works comprise three blast furnaces, of which No. 1 is 55 ft. high, 18 ft. in diameter at the bosh, and has been in blast 416 weeks (Nov. 18, 1873); No. 2 is 42 ft. high, 18 ft. in diameter at the bosh, and was blown out in October, 1873, after being in blast 359 weeks; No. 3 is 55 ft. high, 18 ft. in diameter at the bosh, and has been in blast 307 weeks. No. 2 was put out of blast for the purpose of making certain improvements in its form. The stack is to be raised with sheet-iron to the height of 75 ft., and the interior dimensions of the furnace will be somewhat remarkable, since the diameter at the tunnel-head will be 15 ft., though the diameter at the bosh will be left at 18 ft., as before. This widening of the tunnel-head is, we believe, a step in the right direction; and we shall not be surprised to see American ironmasters before long very generally following the example which the Andover Company is bold enough to set.

The ores used at these furnaces are mostly magnetites from Morris Co., N. J., and particularly from the Hibernia, Allen, Chester, Byram and Hoff mines, containing from 55 to 60 per cent. of iron. A little brown hematite is used, which comes from the immediate vicinity of Phillipsburg. The common cast-iron arrangement of hot blast is employed, with two of the KENT patent hot blast ovens, in which the bed pipe is divided into compartments by transverse partitions, the siphon pipes being placed longitudinally on the bed pipe. With this oven, a high and very even temperature of blast (from 500° to 700°. Fahr.) is maintained. There are three blowing engines, two horizontal, built by WOODRUFF and BEACH, and one vertical, built by J. P. MORRIS & Co., which is one of the largest of its kind. Each engine makes about 17 revolutions per minute, and the blast of all enters one receiver. When the three furnaces are running, the pressure at the tuyères is 3¼ to 5 per lb. square inch.

It was at these furnaces, then owned (1857) by the Trenton Iron Co., comprising COOPER, HEWITT & Co., and others, of New York, that experiments were instituted, for the first time in America, to test the value of an adaptation of the BESSEMER process for blowing cold air, at a high pressure, into molten cast-iron, to produce malleable metal.

The visit of the Institute to this establishment was agreeably prefaced by a social gathering at the house of Mr. J. C. KENT, where an elegant collation was served, and an hour was spent in pleasant conversation, which derived an additional charm from the presence of ladies.

Another visit of great interest, though of brief duration, was that made by the Institute to the Glendon Iron Works. These works comprise five blast furnaces, four of which are situated at Glendon, on the Lehigh, two miles above Easton, and one at South Easton, a mile below Glendon. The latter is connected with Glendon by a narrow-gauge railroad. The furnaces now in blast at Glendon are: No. 2, 50 ft. high, greatest diameter 14 ft; No. 3, 50 ft. high, greatest diameter 17 ft.; No. 5, 72 ft. high, greatest diameter 18 ft. No. 1 was blown out in August, and has been altered from 50 ft. high and 17 feet diameter to 63 ft. high and 18 ft. diameter. These furnaces all have closed tops. The 50 ft. furnaces are blown at a pressure of about 4½ lb. per sq. in. No. 5 is blown at 5½ to 6 lb. per sq. in. The temperature of the blast is 600° to 700° Fahr.—hot enough to melt lead at the tuyères.

The ores are principally magnetites from Morris County, N. J., mixed with soft brown ores from the neighborhood. Limestone is obtained from a quarry about half a mile distant from the furnace, and is delivered on narrow-gauge cars, close to the fillers.

The average period of blast for these furnaces has been about three years, although the South Easton furnace is now on its sixth year. When all the furnaces are in blast, the weekly product is from 1000 to 1200 tons of pig-iron.

The form of charger employed at the Glendon furnaces is described in a paper read by Mr. FRANK FIRMSTONE at the Easton meeting, and soon to be published with appropriate drawings in our columns. Mr. FIRMSTONE is one of the most active and wide-awake members of the Institute, and his fellow-members, who have had frequent occasion to notice with what intelligence and eagerness he is accustomed to examine and inquire into the peculiarities of all the works visited in the excursions of the Institute, were glad of an opportunity to turn the tables upon him and to cross-question him concerning every detail of the arrangements at Glendon. It must be confessed that he proved himself as apt at answering, as at asking questions—which is saying a good deal.

Of the interesting and profitable excursions to Bethlehem and Trenton, we must forbear, for want of space, to speak in the present article. We trust to furnish hereafter accounts of the important works visited on these excursions.

The Signal Service.

THE report of the Chief Signal Officer for the year ending September 30, contains some extremely interesting points. During the exposition at Vienna a congress of meteorologists was held, at which it was decided that measures should be taken for laying out the whole civilized world in meteorological districts, in each of which simultaneous observations should be made at least once daily. A step like this would made the scientific world almost absolutely certain of deciphering the weather signs and learning, within a few years, the important laws of atmospheric movements. The cost of an Extended Signal Office will deter some nations from carrying out a system as extended as ours; but, on the other hand, the greater number of private scientific observers in Europe should enable foreign governments to do as much as we, and at less cost. Our own government is carrying forward this work in a way that shows its favorable appreciation of the results. In addition to the training school at Fort Whipple, where 73 officers and privates received instruction last year, it has established 78 observatory stations in this country, and is in correspondence with 11 stations in Canada, and with three in the West Indies. The last three are at Havana, Kingston and Santiago de Cuba; and as soon as observers can be obtained, three other islands—Porto Rico, Guadaloupe and Barbadoes will be occupied. Of the United States stations, 3 are placed on high mountains for the purpose of noting the movements of upper currents. These are on Mt. Washington, New Hampshire; Mt. Mitchell, North Carolina, and Pike's Peak, Colorado—the last Station being 14,216 feet high. During the year, cautionary signals have been raised 88 times, and in 70 cases storms verified the prediction. The percentage of correct probabilities, in different parts of the country, bears a regular proportion to the number of stations placed in each part, and varies from 81·50 per cent. in New England, to 74 per cent. in the Northwest. In addition to this means of preventing disaster, the Signal Office undertakes to keep the life-saving stations and light-houses along the coast informed concerning the weather. In this way it will be possible to have the entire seacoast guard of the United States directed from some central office. Information of shipwrecks will be immediately published in the cities, and mariners will receive a new defence against our stormy coasts. It cannot be doubted that a system like this will result in much greater safety to the shipping, and will contribute an important element to our future maritime activity. But these stations and light-houses are scattered along a coast which is frequently miles from the lines of telegraph communication, and the Government has, accordingly, been forced to assume the position of telegraph builders. The following lines have been built, or are building:—Pike's Peak to Colorado Springs; Seaville to Peck's Beach, N. J., 10 miles; Sandy Hook to Barnegat Inlet, N. J., 50 miles; Rockport, Mass., to Thatcher's Island, 3½ miles; a line connecting the stations and light-houses from Norfolk, Va., to Cape Hatteras, 137 miles. This makes more than 200 miles of telegraph line required to fill up the gaps in the communications along the coast. It is proposed to place the stations at intervals of 25 miles; and if we give a moment's thought to the spectacle of a central office collecting information from a hundred, or two hundred, stations, and directing the movements of a guard established at distances of 25 miles along our entire Atlantic coast, we cannot fail to perceive that in such a system are included magnificent possibilities for the future of our marine, as well as peaceful triumphs for humanity. The cost of all this work is necessarily large, but it is a branch of expenditure that produces direct returns, and one which the people will willingly meet.

NEW PUBLICATIONS.

NOTES OF A METALLURGICAL JOURNEY IN EUROPE, BY JOHN A. CHURCH, E. M. Twenty-two illustrations. New York: D. VAN NOSTRAND.

This book will be recognized by readers of the *Journal* as a republication of papers which have appeared in it from time to time for several months. They relate entirely to European metallurgy, and were written with the object of setting before American smelters the most recent practice in foreign establishments. Works on metallurgical subjects are still among the class of rare publications in this country; and nothing but the favorable reception these papers have met with, and the frequent kind inquiries made after them, has induced the author to republish them. They were not written as a connected treatise upon any one branch of metallurgy, but chance has led the author to cover a large part of the field of lead smelting. Three distinctive modes of treating lead ores are recognized. One which depends upon the partial oxidation of the ores, and is therefore called the method by Roasting and Reaction, is performed in a reverberatory furnace. Another is Precipitation, in which iron or some compound of it is used to separate the sulphur in galena from the lead, and the third is the roasting and fusion of the ore to a silicate, with the subsequent reduction of the silicate in a shaft furnace. Of these processes the two latter are given. The works at Mechernich, in Prussia are one of the best examples of simple Roasting and Reduction, which can be found, while Freiberg presents an instance of the same process applied to a very complicated ore, by previously eliminating some of the foreign substances. The works in the Hartz Mountains remain, as they have always been, the great exemplar of precipitation; but it is no longer the process which continues to be figured in metallurgies. A great change has gradually come over the metallurgy of lead by the mere increase of iron works throughout Christendom. The cinder from puddling and mill furnaces has been everywhere proved to be the best flux which can be added to lead ores, and, as a consequence, the treatment of these ores in shaft furnaces now in most cases combines the advantages of the roasting and reduction with those of the precipitation process.

The losses incurred in treatment have been very much reduced, and this branch of lead smelting has been made so uniform that close comparisons may be made between the operations of the most distant works. Even when, as in the Hartz, roasting is not resorted to, the use of a basic iron cinder as a precipitant has produced very striking changes in the results of treatment. Thus we see the Altenau works utilizing the sulphur of galena for the manufacture of sulphuric acid, a step which has been made possible only by the poverty in lead of the mattes produced when basic iron cinder is used instead of iron in the fusion of the new ore. As now conducted, the Hartz works offer an admirable example of the economical utilization of an ore, as well as of careful and scientific management.

Modern metallurgy has made still greater changes in the mode of extracting silver; cupellation is so much restricted by the previous concentration of silver in a small quantity of lead, that it is probably safe to say that the amount of lead cupelled is not now one-tenth of what it was a decade ago. In that time, too, PATTINSON's method of concentration by crystallization reached its greatest extension, and subsequently fell so much into disuse as to be retained only in exceptional cases. Its successful rival is desilverization by zinc. This method, first proposed by PARKES, has been greatly improved by other metallurgists, and is in almost universal use. In America the old method of PARKES is more closely adhered to than anywhere else, the principal change being in the treatment of the rich alloy by distillation in *retorts*, an operation which presents difficulties that were first successfully combated by American inventive skill. The Notes contain descriptions of four modifications of the zinc process, and in this respect present matter that is not to be found in any other English work.

The metallurgy of copper is illustrated in the Notes by three processes, all of them combinations of the dry and wet methods. The works at Agordo show how an ore of less than 2 per cent. can be economically treated by roasting and solution in water, while at Freiberg and Altenau copper products from the lead fusions are subjected to the action of acid by two different methods. In addition to lead and copper, the Notes include one mercury furnace and one example of an Austrian gold and silver works. It was the author's aim to present to American readers such examples of foreign work as should indicate the road which improvement in practical metallurgy has followed since the appearance of the latest preceding publications, and also such as seemed to present points worthy of imitation. Writing for a double circle of readers, one composed of men accustomed to practical work, but unversed in the technicalities of the schools, and the other composed of the rapidly increasing number of trained metallurgists, he has endeavored to give the papers such a shape as to be clearly comprehended by one while answering the higher requirements of the other. C.

PROPORTIONS OF PINS USED IN BRIDGES. By CHARLES BENDER, C. E., New York: D. VAN NOSTRAND, 1873.

This little book, which constitutes No. 4 of VAN NOSTRAND'S "Science Series," is an extension of a paper read last February before the American Society of Civil Engineers. If that eminently distinguished body could be persuaded to permit more of its proceedings to enlighten the world, it would benefit both the public and itself. Mr. BENDER'S treatise is an interesting contribution to the theory of strains. It considers three principal questions: the law of distribution of the pressure caused by the tie-bar on the bearing surface of the pin; the law of distribution of the shearing strain over the cross-section of the pin; and the value of its bending moment in any of its sections. American bridge-engineers are approaching in practice the dimensions which theory dictates. Skeleton structures, such as are built by the best American contractors, permit the exact calculation of any of the parts; and this, as Mr. BENDER justly remarks, gives us an advantage over European engineers, who, using riveted work, are unable to make such calculations as will give trustworthy formulæ of dimensions.

A MANUAL OF METALLURGY. By G. H. MAKINS. Second Edition, 100 Engravings. London: ELLIS & WHITE, 39 New Bond street.

This is the latest attempt to provide English students of Metallurgy with a text-book. Something of the kind is very much needed. PHILLIPS' Manual, which, in its day, could fairly claim to be the best, has long been out of print, and it had always the defect of excluding most processes which were not English. PERCY'S works, admirable as they are, cost so much as to be beyond the means of most students. They are also exceedingly bulky, giving so large a proportion of their space to experimental laboratory investigations and to questions of no interest outside of England, that they can hardly be looked upon as hand-books. But as a repertory of information useful to the metallurgist, they are without a rival, and at the present day form the foundation of the leading publication in this branch of technical science among three great peoples—the English, French and German speaking nations. As we said before, something else is needed for students; and when the book before us was announced, we waited for its appearance with great hope that it would prove to be the much-needed text-book on metallurgy. In this expectation we must confess ourselves disappointed.

The author has undertaken to cover the whole field of the industry by which metals are produced from their ores, including such rare metals as Palladium, Uranium, Titanium, Chromium, Manganese, Cobalt, Cadmium, Magnesium, Potassium and Sodium, and about eleven per cent. of his space is given to these subjects and to electro-metallurgy. The latter does not mean the application of electricity to the extraction of metals from their ores, but the deposition of metals from solutions of their salts, as in electroplating. Operations of this kind are usually, and with propriety, included among the processes of chemical technology, and hardly belong to the rougher work of Metallurgy. Of the remaining space a very large proportion is given to the chemistry of metals. Thus specific gravity, crystallography, blow-piping and laboratory apparatus, take up about six per cent. more of the volume. We now come to the treatment of those metals which usually form the subject of metallurgical treatises. Three hundred and sixty-six pages are allotted them, but one hundred and fifty-five are taken up with details which are entirely chemical in their character, and this amounts to 27 per cent. of the whole volume. In fact, when we examine the work *in toto*, we find that, with every allowance, at least 45 per cent. of the space is taken up with details of the laboratory, excursions into other sciences, and similar departures from the real aim of the work. We were so much struck with the extreme favor shown to things outside of the author's proper field, that we picked out from the hundred illustrations in the book those which do not belong to metallurgy, and found them to number no less than thirty-seven. There are no less than three chemical balances figured, six illustrations of the blow-pipe and its apparatus, and in the chapter on silver, fourteen figures are given to assaying and similar laboratory work, and only nine to metallurgical apparatus.

These facts are a sufficient explanation of our reasons for criticising the claims of the book to be considered a Manual of Metallurgy. We do not say that the work is not adapted to some other field. Its author is Lecturer upon Metallurgy at the Dental Hospital, London, and we perfectly understand that it is well adapted to the wants of dentists who work in metals and use some of the operations of metallurgy. The metallurgy they need is probably a simple explanation of practical work, combined with a more thorough course on laboratory metallurgy, such as they expect to practice. But the chief criticism we make upon this book is, that its metallurgical part is far from being what it should be. The title-page of the book is dated "1873," but much of its information belongs to an age which is now almost entirely past. For instance, the liquation of black copper is spoken of as still in use at Mansfield, though it has been succeeded by amalgamation, Augustin's method, and the Ziervogel method, each one of which was an improvement, not only on liquation, but on its predecessor. In fact, the operation formerly known as liquation emphatically belongs to the metallurgy of the past. So, too, does the description of the Hartz precipitation by iron, including the furnace, which is no longer in use.

While Mr. MAKIN'S book is not a Manual for Metallurgists, lacking both clearness and fullness, it may still serve as a means of instructing those who want to know what metallurgy is in general, without caring to study its processes specifically. He has used the new chemical terms throughout; and, though many modern processes are omitted, others are given, or at least mentioned. We regret that we cannot say more than this. The need for a text-book on Metallurgy is evident, and we would like to see PHILLIPS take his *Manual* of fifteen years ago in hand once more, leave out the mining and mineralogy, add such processes as have become in vogue since the first edition was issued, and thus make it a valuable record of the present state of English Metallurgy.

CORRESPONDENCE.

The Canal Question.

TO THE EDITOR—SIR: In regard to the proposition to propel the boats in the canal by means of a current of water upon which the boats shall slide, or drift, without any other power than that called gravitation: it is well to examine the subject fully, and in detail, and see what can be done, what it is worth and what it will cost to do it.

First, then, the Erie Canal is some 350 miles long, some 70 feet wide on the surface, by 56 feet wide on the bottom, by 7 feet deep; the longest level is 65 miles, the total number of locks being 72, of which 57 are double and 15 single. The locks being only 110 by 18 feet, it is evident that a stream 20 feet wide would accommodate and carry all of the boats going in one direction, and another similar stream would accommodate all of the boats going the other way; these two streams may each be confined between wooden aprons hung to floating booms, and being located twenty feet apart leave a neutral space of still water between the currents, which would accommodate any boat desiring to stop, or transfer from one current to the other, and also a neutral space some four feet wide between the aprons and either bank, effectually preventing any abrasion thereof. The booms of ten inch, round timber of hard wood, will be strong enough to guide the boats without need of the ordinary helm. Also by thus confining the currents to actual working width, much less power will be required to drive them, and they will be more effective than if running along the banks. Another advantage gained thereby is the turning of curves on the largest radius the canal admits of in each case. The currents may average six miles per hour, but it is no object to bring boats forward any faster than the locks can pass them; according to the reports of the State Engineer, it appears that this is about two hundred boats per twenty-four hours, averaging some seven minutes per lockage. Hence the boats should be some seven minutes apart, this with an average current of six miles per hour, or a mile in ten minutes, would place the boats about seven-tenths of a mile apart. At this rate the canal would accommodate five hundred boats going each way, or one thousand boats under way at once. Of these the five hundred boats upon the down trip (carrying no stables or engines) may each bring its two hundred and fifty tons of freight or grain, and arriving at the rate of two hundred boats per day, give an aggregate of 50,000 tons per diem, which, for the whole season of two hundred days, would mount up to the sum of 10,000,000 tons per season (instead of the present average of 6,000,000

tons), as the capacity of the present canal; and the passage from Buffalo to Albany would be made as follows: 350 miles at 6 miles per hour takes 58⅓ hours running time, plus 72 lockages at 7 minutes each, or 8.4 hours, making 66.7 hours, or less than three days, instead of the present average time of ten days.

To drive this six mile current put, at distances of one mile apart, engines capable of moving a stream, with a cross-section of twenty square feet, at the initial velocity of nine miles per hour, and it figures thus: 9 geographical miles per hour equal 15 feet per second, equal the velocity due to a pressure column of less than 4 feet high; therefore, a body of water 4 feet high by 20 square feet section, or 80 cubic feet, equal to 4,800 lb., lifted 4 feet per second, will be required. This takes 1,152,000 foot pounds per minute, or 35 horse power, and for both currents 70 horse power per mile, which, at 3½ lb. of coal per hour for each h. p. will take 4,200 pounds of coal per mile each day, making for the 350 miles, 148,000 tons of coal for the season of two hundred days; this, at $6 per ton, would cost $888,000. The first cost of the machinery would be some $3,500,000, that of the aprons, &c., $1,750,000.

Interest on cost equal	$367,500
Labor $5 per day per engine	700,000
Cost of coal, as above	880,000
Deterioration, 10 per cent	350,000
Running expense per season	$2,297,500

Take round numbers and say $3,000,000 for moving 10,000,000 tons of freight 350 miles, and it figures 0.0858 of one cent to move one ton one mile, against 0.88 now required, and this is passing all freight going westward free, as no account is made of it in the above figures, except to pay the cost.

The above arrangement would pay the State over $5,000,000 net revenue on 10,000,000 tons moved instead of the present $3,000,000 on 6,000,000 of tons.

A. V.

The Surveying of Coal Mines.*

BY OGDEN HAIGHT, E. M., of Etna, Pa.

THE survey of a coal mine is generally made to determine, and show by means of a map, the character and extent of the workings, the methods of exploitation, transportation, ventilation and drainage. Special cases sometimes arise, however, where the accomplishment of such objects as the following is chiefly desired: To ascertain whether or no the workings have been carried over the lawful boundaries of the property and are infringing upon the rights of others; to determine the exact amount of coal that has been taken out, and how much there may be remaining; to determine the position of a point in the mine exactly under one on the surface—*e. g.*, when a shaft is to be sunk from some known point on the surface of the property, and it is desired to work upwards also, from a point in the mine, so as to complete the work more quickly. Inasmuch as to accomplish these objects the greatest skill, care, and accuracy are necessary, the operations of mine surveying may be regarded as among the most difficult which come within the province of surveying.

We may therefore safely assert that the compass, or "dial," as it is sometimes termed, should not be employed in a mine survey, for the following reasons: 1st, it is not sufficiently accurate, as it only reads to thirty minutes with any amount of precision; 2d, we are obliged to sight at the string of a plumb-bob, at the head of a nail, and at other fine objects which can not be seen through the sights of a compass; 3d, inasmuch as the sights obtainable are usually quite short, seldom averaging over 75 feet, the greatest degree of accuracy in setting up and adjustment is indispensable; 4th, the irregular, diurnal, annual, and secular variations to which the needle is subject, and the influence of surrounding objects upon it, producing attraction, interfere with accurate work.

In consequence of these defects in the compass, another and more accurate instrument must be used—one provided with a telescope and cross-hair, an arrangement for noting very closely the horizontal angles deflected, and the vertical angles described, which is only effected by means of a vernier. These requisitions are fulfilled by two instruments, the theodolite and the transit, the former being generally employed in England, and the latter in this country. They are essentially the same in principle, the chief difference being that, in the case of the transit, the telescope may be completely reversed without taking it from its bearings, as is necessary with the theodolite. It is therefore much more convenient than the latter instrument. It is not designed in this paper to describe and explain in detail the different parts of these instruments and the mode of using them, as such a description may be found in any of the text books; we shall therefore proceed at once to the consideration of the main subject.

Before entering upon a description of the different cases met with in the survey of coal mines, it will be necessary to determine what are the requisitions in the way of instruments and assistants.

Instruments.—The mine surveyor must be provided, in the first place, with a good transit. In this, the plate surrounding the compass-box should be of sufficient width to permit a lamp to be placed thereon. The cross-hairs will be more easily visible if they are a little coarser than for ordinary work. The telescope should be fitted with a silver-plated reflector, such as are now furnished by instrument makers, and the instrument should have a vertical quadrant, and a level with graduated scale under the telescope. A tripod with one adjustable leg will be found very convenient for setting-up. A compass is also necessary, both for running location and property lines on the surface, and for surveying old workings in the mine, where (the iron having been removed and extreme accuracy not being required) it may be more advantageously employed than the transit. A moderately light 100 foot chain should be employed for outside work, and a 50 ft. chain for mine-work, where the sights are much shorter. A steel tape should be used for very accurate measurements. A pocket compass with clinometer attached, set in a square edged frame, is most convenient for noting dips. A pocket-level is often very useful. Other necessaries are: a copper lamp; a can of white lead and brush for marking stations; several plumb-bobs; an axe and a hatchet; nails; note-books; and a roll of iron wire to be used in lining shafts.

Assistants.—Of these he should have at least three, and not more than six—one to carry the rear end of the chain and take side-notes; a fore-chainman, who may also give back-sights if necessary; and a man to prepare stations and give foresights. Besides these, it is always best to have at hand the mine-boss, or some one familiar with the mine, to see that every thing is clear and safe, and to give such explanations as may be required. He generally assists in making stations, etc. These assistants must be drilled in their respective duties, so as to perform them quickly and accurately.

Surveying Drifts and Tunnels.—The simplest case of a mine-survey is that of a mine entered by drift or tunnel. By a drift is here meant a simple gangway, driven in the coal-seam itself, from the outcrop, at or above water level; by a tunnel, a way cut through the intervening strata to the seam from the outside. As far as our purpose goes, they are essentially the same. If the mines are working, the night-time is selected for making the survey, as there is then no inconvenience to be dreaded in the way of smoke from blasting, cars running through the gangways, etc. Upon arriving at the mine the first thing to be done is to secure a base line on the surface, where there is no attraction, as the first bearing must be obtained by means of the needle, and must therefore be accurate. Hence it should be read as closely as possible, while succeeding angles are obtained by means of the graduated circle and vernier. Two stone prisms with a hole in the center of the upper face of each, are set in the ground, as far apart as possible, in any convenient location; the instrument is set up over one of them, and the bearing of the line is obtained. Large stakes driven firmly in the ground with a small nail in the center of each, may be employed if more convenient. In taking the sights, the north end of the needle should always be kept ahead of the surveyor, and the vernier should be set at zero at every station.

After the bearing of the base-line has been carefully taken and noted, and the line accurately measured, the necessary lines are run to a station in front of the opening, situated in a position where the longest possible sight into the mine can be obtained. The mine-boss going into the mine with a light as far as possible, the assistant remaining outside moves about until the desired point is found. This station should be made a permanent one if possible. The instrument is here set up and a sight is taken to the first station in the mine. In some mines the breasts or working chambers are turned off from the gangway at a comparatively short distance from the mouth of the entry. In such cases, the station is made in front of one of them, a point being chosen which is visible from the outside station and from which a good sight can be obtained toward the end or "face" of the chamber. At the point chosen for the station a nail is driven into the roof, if possible, or the point is marked with a dot of white lead, and a circle of white lead is drawn around it. A plumb-bob is then suspended by a string from the point to the floor, and a piece of board with a nail driven in the center is placed under it in such a position that the head of the nail is directly under the point of the plumb-bob. Lumps of coal are then placed upon the board on either side of the nail, to ensure steadiness; and the assistant holds the lamp with the flame directly behind the head of the nail while the sight is being taken. In some cases the sight is taken at the string of the plumb-bob, the light being held behind it in the proper position. It is, however, always necessary to fix the board and nail in position, in order that the instrument may be set up over it. After the sight has been taken, the instrument is removed to the station and set up, and a back-sight is taken upon the station outside. Sights are then taken to the next regular station in advance, and to a point as far up the chamber as possible, which should be marked with a cross of white lead; or a regular station should be made, if the line is to be extended up to the face.

The next station in the gangway, and all succeeding stations, are made in the same way as the first. They should be located at points from which long sights can be obtained in advance. When chambers or gangways turning off from the main road intervene, it will be necessary to abridge the length of the line in order to obtain sights up them. In the case of chambers alone, turning off in close succession, and running in parallel lines, it will be sufficient to take a sight up every third one, simply measuring the lengths of the others. But where a gangway turns off, it will be necessary to place the station in a favorable position for sighting up it to a regular station, from which the line may be afterwards extended.

Considerable maneuvring is required in finding favorable positions for stations. The surveyor standing by the instrument holds his light over it, while the assistant goes on up the gangway to the farthest point, at which it is visible to him; here he stops, and sends another on ahead as far as possible, and then by moving about, finds the points desired. When, however, a chamber or gangway turning off intervenes, he stations himself immediately opposite to it, and sends one assistant up it as far as he can go, and another on up the main gangway, and selects a point from which the instrument being clearly visible, the most favorable sights can be obtained in both directions. Here the station is made at once. Much time can be saved by the use of care and judgment in the selection of points for

*A paper read before the American Institute of Mining Engineers at Easton, Pa., October 23, 1873.

stations. It is therefore advisable for the surveyor to make a thorough inspection of the mine to see how the workings are conducted, before commencing the survey, as he is thereby enabled to form a plan of operation.

The lines through the main gangways are to be considered the main ones, all side sights up chambers, etc., being merely accessory. Closed surveys should be made wherever it is practicable. In naming the stations, one of the letters of the alphabet is chosen for each gangway, and the sub-numerals are used in connection with them, as A, A_1, A_2, etc., B, B_1, B_2 etc. The name should be plainly marked by the side of the circle at each station. In this manner the survey is continued until completed.

The Surveyor's note-book should contain a full account of everything in connection with the survey. In commencing, he should write in it the date, name of the mine to be surveyed, proprietors, situation, the party in order of rank, instruments employed, time of starting, and any other circumstances he may deem important. The location of the different stations must be described, the way in which they are marked, and any other items of importance.

In keeping the notes, the angles and bearings are usually entered on the left hand page, and the distances and side notes on the right. Each note-book should be numbered and an index kept of all. It is sometimes well to copy up all the mine-notes, in fresh clean books, in ink.

Side-notes and measurements of lines are taken by the hind-chainman. In measuring a line, a light is set at the forward terminus, and the fore-chainman, holding one handle of the chain, and a pin in one hand, and a light in close proximity in the other, is put into line by the direction of the hind-chainman at the end of each chain. The chaining is always done horizontally unless special directions are given by the surveyor to chain on the pitch, in cases where, the degree of its inclination having been previously measured by the instrument, the corresponding horizontal measurement can be easily calculated. When the gangway is nearly straight, offsets to its sides need only be taken at every 50 or 100 feet; but where it is curving more may be necessary. Offsets are also taken to any points to be noted, such as corners of pillars between chambers, and of gangways and airways. In measuring up chambers, they are taken to edges of cross-headings or air holes into adjoining chambers. By measuring through these at right angles to the chain, or, in other words, prolonging the offsets, the dimensions and notes of several contiguous chambers may often be obtained. The dip of the vein, and sections of it, should be taken at various places. All faults and irregularities in the lay of the vein should be noted; likewise all air doors and air ways, so that the method of ventilation may be shown on the map.

Slopes.—Slopes are simply gangways following the inclination of the seam. They therefore present no new problem. In running the line down a slope, the inclination must be measured at every station by the vertical quadrant in order that the chaining may be done on the pitch. The degree of dip should also be taken with the clinometer at several points.

Shafts.—In the case of a mine worked by means of a shaft, the method of procedure is somewhat more difficult. It is necessary to obtain at the bottom of the shaft a line coincident in bearing and position with one upon the surface, that is to say, that they shall both be portions of one and the same straight line. This is accomplished in the following manner by an operation which is technically termed, "lining" the shaft.

The instrument is set up at some point on the surface directly opposite to, and at some distance from, the center of the shaft, from which a clear view to it can be obtained. Iron or steel wires, with a 10 or 15 lb. weight attached to the extremity of each, are then suspended from the opposite sides of the shaft to the bottom. The wire is let out gradually from a reel, in order to prevent kinking. As soon as the weight reaches the bottom, it is placed in a keg of water to ensure steadiness, by an assistant who remains below during the entire operation, in order to see that in whatever positions the wires may be placed, the weights do not touch the sides of the keg. The upper ends of the wires are attached to a beam nailed horizontally to the framework of the shaft, at about 10 feet from the ground. The wires are suspended as nearly as possible from points half-way between the lateral extremities of the shaft, and are at first put into line from the instrument by the eye.

This done, the party step upon the cage and are lowered slowly, in order to see if the wires come in contact anywhere with the sides of the shaft or its framework. Having then adjusted them in such a manner that they are perfectly free from such contact, still preserving their approximate alignment, a sight is taken through the instrument to the first wire. To enable it to be clearly seen, a piece of white paper is held behind it, upon which light is thrown from a lamp held in front. It is then held to one side for a moment, whilst the second wire is brought into line. It being now certain that they still hang perfectly clear and plumb, a sight is taken upon both at the same time, and they are brought into exact coincidence with the cross-hair of the instrument. A permanent center is then marked upon some fixed object in the prolongation of the line.

This done, and some one being left upon the surface to see that the wires are not disturbed, a descent to the bottom is made, and the instrument is set up in a convenient position opposite to the wires, and as nearly in line with them as the eye can determine, a small nail being driven into the floor at the point chosen. After setting up and carefully levelling the instrument, a sight is taken upon each wire in succession, and the center of the instrument is moved little by little in the requisite direction, until the exact point of alignment is found. The nail is now driven in at this point.

This operation requires the use of considerable care and patience. The wires must of course be perfectly steady and plumb, as any slight disturbance of them might easily impair the accuracy of the result.

After a permanent center has been marked in the line of sight, a foresight is taken to a station in advance, and the survey is then carried on in the usual manner. After removing the instrument a point is found upon the roof exactly over the nail, where the station is marked.

In some special cases, it may be necessary to repeat the alignment of the shaft several times.

In order to find a point on the surface directly over one in the mine, the shaft having been accurately lined, the necessary lines are run from the station on the base line to the point fixed upon; these lines are then repeated on the surface from a corresponding point on the base line, or in case of impediments to sight, parallel or traverse courses are run to it.

The usual way of determining the amount of coal that has been taken out from a mine, is to run the lines around the faces of the chambers, that is to say, close to the "rib" or unworked body of coal. The area worked over being then known, the amount taken out is roughly calculated as two thirds of the whole contents, the system of working usually followed being to make the chambers twice the width of pillars. This is of course not a very accurate process; but where the areas have been well worked over, it is a good approximation.

Spiegeleisen.

Mr. D. M. GORDON, Managing Director of Landore Siemens Steel Company, writes to *Iron* that, "it may interest your readers to know that we have been manufacturing spiegeleisen of the purest kind, with from 10 to 20 per cent. of manganese, using no spathic ore whatever. To our manager, MR. JAMES RILEY, we think is due the credit of being the first to manufacture spiegel, on a commercial scale, in Great Britain, without using spathic ore."

MINING SUMMARY.

Colorado.

THE SAN JUAN MINES.

From the Mining and Scientific Press of Nov. 1.

Considerable interest is being manifested just now concerning the San Juan country and its mines, and glowing accounts of the district appear in the papers from the pens of correspondents, most of whom, however, know little about mining, judging from their effusions. The specimens of ore recently exhibited at the Territorial Fair, in Colorado, have had the effect of creating an "excitement," and numbers of people are going to the new mines just as winter has set in, contrary to the advice of those who have been there and know what the winter is. Mr. P. H. NEWBILL, who has been in this State some twenty-one years, and has been "in the mines" a portion of the time, spent the past summer in the San Juan country, and returned to this city last week for the winter. In conversation with him, since his return, we learn some interesting facts concerning the mines there. He says that there have been in all about 500 people there this year, but not more than 300 at one time. There was only one other Californian there besides himself, most of the prospectors being Colorado men, but quite a number from Kansas and Dacotah. The majority of the men there knew nothing at all about mining, but were stock men, farmers, etc., a fact which may account for the wonderful reports of richness we see in print. They talk of rock *yielding* $2,000, $3,000, $8,000, and even $15,000 per ton, which is of course all "bosh," especially in connection with the statement that the leads run from 30 to 80 feet in width, all mineral.

Mr. NEWBILL says that nearly all the prospectors have left for the winter, most of them, however, himself included, intending to return in the spring. The country itself is not so bad in the winter, but the Rocky Mountains have to be crossed from Del Norte, which is 100 miles from the mines. After preparations are made, adequate shelter provided, etc., work can be carried on all winter. There are two districts—Las Animas and Baker—both in the same mineral belt. They comprise a territory from 12 to 15 miles in width and 60 miles in length. All the locations made by the miners, so far, have been made on croppings, no blind leads having been searched for. The leads run from the foot of the mountains up to the top, and vary in width from a few inches up to 70 and even 80 feet in width. The ore is generally galena, interspersed with what the miners call gray copper, some of which assays over $3,000 to the ton.

At present there are no towns, nothing but a few scattered tents and log cabins, as usual in new districts. The men who went in there made a few locations, and then left for the winter. There is a small mill there, called the Little Giant, with a Dodge crusher, which has a capacity of about five tons per day. There have been several thousand leads located during the summer, the owners of which intend returning in the spring to work them. All over that part of the country the people are much excited, and Mr. NEWBILL thinks there will be a great rush over there in the spring.

We inquired of him the expense of the trip there from this city, and he says it will cost $85 from here to Cheyenne; from Cheyenne to Denver, $10; Denver to Pueblo, $10. From Pueblo there is now a stage line, the fare on which will be from $5 to $8 to Del Norte. Or, if preferred, the prospector can procure *burros* or horses from Pueblo to Del Norte, a distance of 130 miles, with a good road all the way, and wood, water, and grass in plenty. Del Norte is the proper place to outfit for the mines, as provisions, tools, etc., can be purchased there. From there to the mines the distance is 100 miles, with a good road to within 30 or 40 miles of the mines; from there the road is mountainous. Wagons have been running to the Little Giant mill during the summer, but the road is rough as yet. This wagon road is good to within 40 miles of the mines, and men are working every day on a toll road over the mountains. It took Mr. NEWBILL five days to get to Pueblo, and from there to the mines will consume about eight or ten days. This will make in all (say) about two weeks' trip. Provisions can be procured at Del Norte, and packed or hauled to the mines.

The summer there is quite pleasant, but somewhat showery. It is difficult to get into the country until well along in May, on account of the heavy snows on the road. The mines are in Baker's Park, and the Las Animas river heads in the district. The most natural way to get to the country is out by some place near Salt Lake City, the only objection to a route in that direction being the presence of Indians all the way from Fort Gunnison. Parties should not go that way at present on account of the

Indians, but it will eventually be the route most travelled. The mines are only about 350 miles from Salt Lake, and a road in the direction indicated would save the circuitous route by rail.

Mr. NEWBILL brought with him a quantity of ore to be properly tested, some of which is in appearance very rich. He says the most peculiar thing in the district is the enormous size of the ledges and their number. He says the reports from there are exaggerated, but that the district is perfectly able to stand on its own merits without any puffing. Some of the large ledges—70 or 80 feet—contain ore assaying from $140 to $200 per ton, and plenty of it. The $8,000 ore he did not say anything about, but probably specimens could be found that would *assay* that much.

Among the principal mines of Las Animas District are the Green Mount in, Shenandoah, Mother Comstock, McGregor, Stephens, and Little Giant. The Green Mountain has a vein of mineral from three to five feet in thickness, and an assay of the ore made by Mr. HEMME, of this city, gave $242 and $2,698 per ton. It is owned by Messrs. MILES, T. JOHNSON, of Del Norte; D. ANDREWS of Santa Fe, WM. MULHOLLAND and THOS. BLAIR of Animas District. The Shenandoah has a vein of ore three to five feet wide, which assays from $200 upwards, and is owned principally by Maj. HAMILTON, of the Little Giant Co. The Mother Comstock has a large vein of mineral, which is said to assay well; it is owned by ROBT. BELL, F. S. KETCHUM, J. W. WALLACE, WM. COOK, and others. The Manderfield is a very large lode, carrying mineral almost 70 feet in thickness, and is said to assay very high for galena ore. It is owned by Dr. ANDREWS and others. The McGregor is not so large as the above-named mine, but the ore is very rich; owned by ROBERT MCGREGOR. The same will apply to the Stephens' lode, named after its owner.

The Little Giant is a gold lead, upon which has been done nearly all the work in the district, in the way of development. Besides the above named, hundreds of others that promise to be equally valuable have been located. Among these is one lately discovered by R. J. MCNUTT and GEO. HOWARD, called the Poughkeepsie, which is said to assay from $1,900 to $2,800 per ton. Mr. J. L. WIGHTMAN, District Recorder, has some very large and apparently rich leads. Dr. JAMES BERTON, of Pueblo, also made some valuable locations. Messrs. CARLEY, JOHNSON & Co., at the mouth of Eureka Gulch, have a large number of mines, which promise as much as any in the district, prominent among which are the Ohio, American Flag, and Hamlet.

In the Lake District, which lies northeast of Las Animas, there are some very valuable mines, among them the Major, owned by Maj. J. CAREY FRENCH, JAS. PHILLIPS, FRED. SIMMS, PETER ROBINSON, Mr. SHAW of Del Norte, and Capt. NUGENT of Kansas. The Scotland and Mark mines are also considered good, and are owned by PETER ROBINSON, FRED. SIMMS, J. PHILLIPS, SHAW, Capt. W. N. GREER and Capt. NUGENT. The Uhle and Ulay are also good-looking claims, with from three to five feet solid mineral, owned by CHAS GOODWIN, Mr. MEAD and Mr. HANSON. There is a large field for prospecting, but none should attempt the trip during the winter.

Utah.

From the Utah *Mining Gazette*, of NOV. 8.

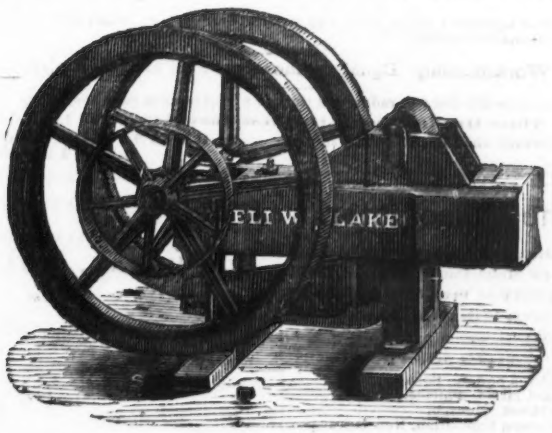
MINING IN CITY CREEK.

The General Scott is not being worked at present; but a contract has been let to a party of miners already working in the camp, to sink the shaft one hundred feet deeper than at present. We noticed that since our last visit a substantial log cabin has been erected to afford comfortable winter quarters for those working the mine. The contractors referred to will commence operations on the Scott shaft in the course of a week from now, and it is expected the results will be such as to induce the owners of the mine to push the work ahead without cessation. The Summit shaft has been sunk to a depth of fifty seven feet eight inches. The last thirty feet on contract, during which time twenty-three tons of ore were extracted from the shaft. This mine is said to be shut down for the season, but work is to be resumed as soon as the inclemency of the winter months shall have passed. The Summit is below the General Scott, and west of it, on a low divide, on which account the location will probably be subject to a greater depth of snow than the Scott. It is the opinion of those working in the immediate vicinity, however, that work could be prosecuted with advantage all winter, should the owners feel so disposed, as the shaft is covered by a good log cabin. the same party of men who sunk the last thirty feet in the Summit shaft, are now engaged sinking a similar number of feet on Red Bird. The shaft is at present down forty-seven feet, and the prospects are that ore will shortly be struck. In fact, ore could be taken out now by drifting, but the object of the owners is to sink the shaft to tap the main body of ore, that indications point to as lying beneath. The Summit and Red Bird are undoubtedly valuable prospects that will one day develop much wealth. The Victorine is being worked on a contract to sink fifty feet on its vein of ochre and galena. This is looked upon by miners as being a good prospect, needing only to be developed, to produce a first class mine. Work on the Henry has been suspended for some time, but will be resumed the coming week, as a contract to sink fifty feet has been let. This mine is situated in a very bleak place on the ridge of Scott hill, to the east of the Scott mine. The Chip Monk is also closed for the season, as is also the Georgia, which has an incline sunk sixty-five feet on an eighteen inch vein of galena and ochre. The G. Q. Cannon has a shaft down twenty feet on a four feet six inch ledge of free milling ore. This mine is looked upon with flattering anticipations by the owners, who it is to be hoped will some day in the near future realize their expectations. The San Domingo is calculated to inspire confidence in the most skeptical, as it gives evidence that City Creek mountains are equal to those in other districts in their ore producing character. This mine has a shaft down seventy-five feet on a vein of galena and black sulphurets, some of which assays as high as $300 per ton. We understand that ore from this mine is being shipped East. The Merrimack and Great Western are two good prospects. The former has a fourteen feet and the latter a twenty-three feet shaft sunk on vein matter, indicating that ore is to be found at no great depth. The None Such also has a four feet six inch vein of galena and ochre mixed, and a shaft sunk on it fourteen feet in depth. Work, however, is suspended for the season. The Alabama shows a full face of ore similar in character to the None Such, and bids fair to become a good mine. A shaft has been sunk on it twelve feet deep. The shaft of the Flagstaff is down eighteen feet on a three feet vein of galena and Ochre. Work is suspended on this mine also. The New Jersey situated in Dry Gulch, is being worked, and will, according to present calculations, continue to be during the winter. The shaft is down about twelve feet on a vein of galena. We noticed in some of the latest pieces taken out traces of chlorides. It is the intention of those working the mine to drift, or sink an incline to the east of the shaft, as the vein evidently dips in that direction. The Idaho, a sister mine to the New Jersey, is being worked also with much satisfaction to its owners. A shaft is down about seventy feet on vein matter interspersed with ore. The Julia, Eldorado, Nixon, Rob Roy and Richmond, on the other side of the gulch are shut down for the season. The New Jersey and Idaho are provided with comfortable lumber houses for the accommodation of workmen.

From the number and character of the mines above mentioned, and the amount of work done on them, it will be seen that those interested in that district are sanguine of the ultimate outcome of mining in that region. Neither are those claims referred to, all that make up the sum total of developments of the district. There are quite a large number of promising prospects in other parts of the canyon, which lack of time precluded us from visiting. Those mentioned are the principle ones, and whereon the greatest amount of money and labor has been expended.

MISCELLANEOUS.

BLAKE'S STONE AND ORE BREAKER.



The office of this Machine is to break Ores and Minerals of every kind into small fragments, preparatory to their further comminution by other machinery. Also to break stone for McAdam roads, and Ballasting Railroads.

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☞ The Patents obtained for this machine in the United States and in England having been fully sustained by the courts after well contested suits in both countries, all persons are hereby cautioned not to violate them; and they are informed that every machine now in use or offered for sale, not made by us, in which the ores are crushed between upright converging faces or jaws actuated by a revolving shaft and fly-wheel, are made and used in violation of our patent.

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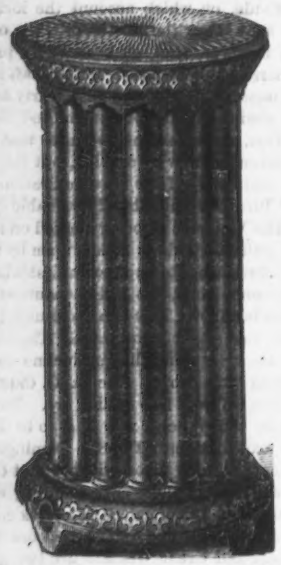

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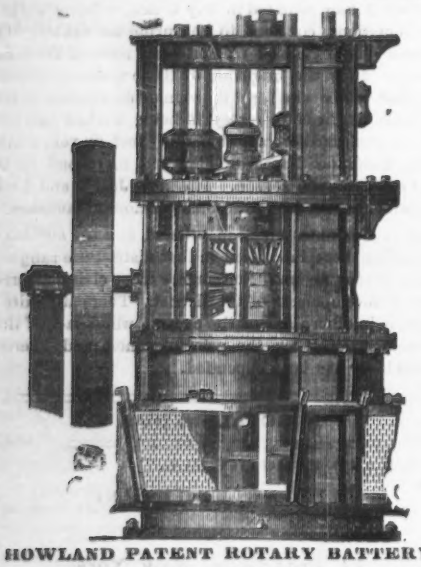

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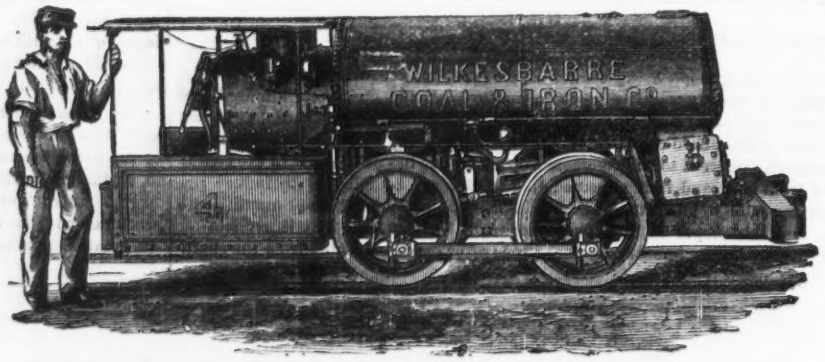

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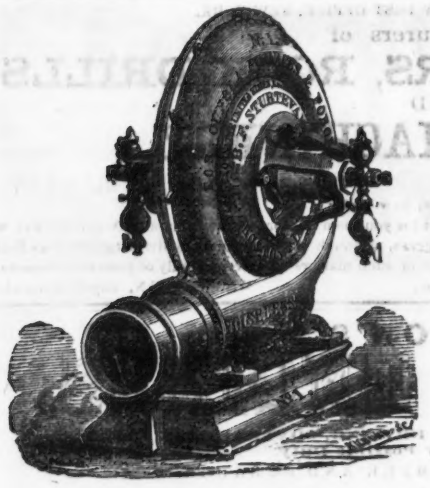

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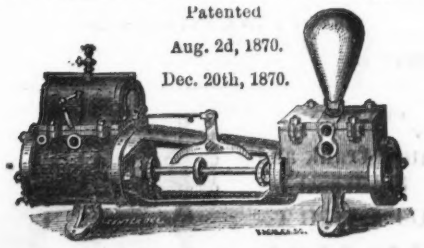

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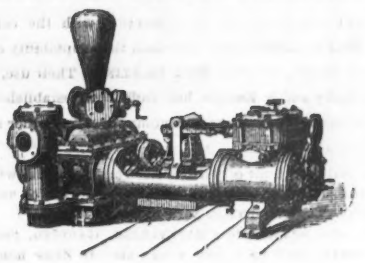

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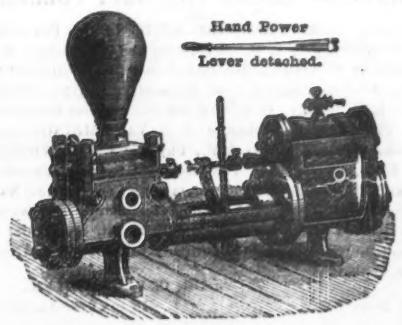

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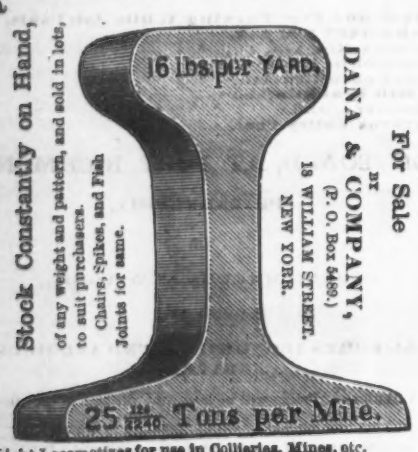

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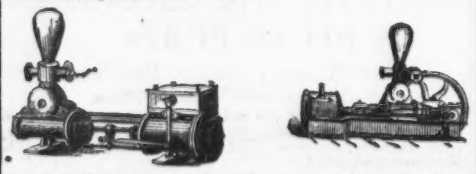

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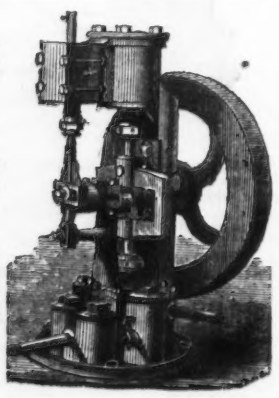
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